Research, development and evaluation strategies for pharmaceutical education and the workforce:

A global report

2017

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Contents

Foreword 3

Executive summary 4

Part 1 Introduction and background 6

Part 2 Progress towards the Pharmaceutical Workforce Development Goals (PWDGs) 9

Part 3 Strategies for advancing the global pharmaceutical workforce agenda 31
- 3.1 Evaluation and impact for global workforce development 31
- 3.2 From workforce intelligence to workforce development 37
- 3.3 Building academic capacity and the academic workforce 40
- 3.4 Leadership development: preparing the pharmaceutical workforce 45

Part 4 Research and development in technology-driven education 52

Part 5 Summary and conclusions 57

Annexes 59
- Annex 1 Pharmaceutical Workforce Development Goals (PWDGs) 59
- Annex 2 PWDGs alignment with global health workforce strategies 64
- Annex 3 Overview of FIP*Ed* tools 66
- Annex 4 Acknowledgements 70

Foreword

The International Pharmaceutical Federation (FIP) hosted the first Global Conference on Pharmacy and Pharmaceutical Sciences Education in Nanjing, China, on 7 & 8 November 2016. The global conference was an exceptional event that gathered pharmacy leaders from around the world to create a globally shared vision for transformative pharmacy and pharmaceutical sciences education.

Following an extensive consensus-based consultation process, three critical documents that set the future milestones for workforce development through education were adopted at the global conference: (1) a Global Vision for Education and Workforce, (2) Pharmaceutical Workforce Development Goals, and (3) Statements on Pharmacy and Pharmaceutical Sciences Education ("the Nanjing Statements").

The global vision describes the future directions of our profession and how education can support the evolution of science and practice. A set of 13 Pharmaceutical Workforce Development Goals aim to facilitate the implementation of the global vision through a series of measurable, feasible and tangible goals. The Nanjing Statements are a set of 67 statements that describe an envisioned future for education, to enable the enhancement of professional education standards worldwide.

A full report of the global conference, "Transforming Pharmacy and Pharmaceutical Sciences Education in the Context of Workforce Development", was launched in May 2017. Through the report, FIP calls on leaders in pharmacy practice, pharmaceutical education and other key stakeholders to support and advocate the implementation of these key outcomes in their countries.

Under the aegis of FIP Education (FIP*Ed*), FIP is committed to inform, guide and support the strategic planning and implementation of the outcomes to facilitate the transformation of the global pharmaceutical workforce in line with overall health workforce strategies promoted by national and international agencies.

Research, development and evaluation are key mechanisms for strategy implementation and this report widens the evidence base for research, development and evaluation strategies for pharmaceutical education and the workforce. With evidence-based expert recommendations and comprehensive case studies from 21 countries around the world, the report provides guidance on aligning national research, development and evaluation projects with the global vision and Pharmaceutical Workforce Development Goals.

This document is intended for all members of the pharmaceutical workforce, pharmacy leaders, governments and other stakeholders to catalyse needs-based planning, priority setting and forward action towards implementing the global vision. The report is also intended as a tool for member organisations to help prioritise and facilitate the adoption of the Pharmaceutical Workforce Development Goals in the context of their national strategies on health and workforce development.

FIP*Ed* — armed with a clear, shared global vision — is committed now more than ever to advance the global pharmaceutical workforce in the context of education and training. The first FIP*Ed* publication following the launch of the Nanjing roadmap, this report aims to enable global action to transform the pharmaceutical workforce in line with the newly adopted global roadmap.

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EXECUTIVE SUMMARY

1. Key messages

1.1 Healthcare access and delivery faces significant global and local challenges; rising demand, increasing co-morbidities and demand for medicines expertise particularly stand out for our profession. Investing in the scale up of the health workforce around the world to meet this general demand is a clear objective shared collectively by the World Health Organization, United Nations agencies, and other global leadership bodies.

1.2 Research, development and evaluation mechanisms are integral to achieving progress on our Global Vision for Education and Workforce[a] and the Pharmaceutical Workforce Development Goals[b] (PWDGs). Global engagement to make research, development and evaluation strategies an important consideration for implementing the pharmaceutical workforce development agenda is a critical next step for our profession.

1.3 The first FIP*Ed* publication following the launch of the Nanjing roadmap, this report starts the discussion to share and evaluate the state of global research, development and evaluation mechanisms that will support national leadership bodies and member organisations in the effective implementation of a needs-based pharmaceutical workforce development roadmap guided by the Nanjing outcomes.

1.4 Data was collected from 21 countries around the world to better understand their national-level research, development and evaluation strategies for the pharmaceutical workforce and how they are aligned with the PWDGs. The PWDGs are aimed to be a set of measurable, feasible and achievable goals. The ability to align national strategies with the goals show that they can be measurable. Collectively, the high alignment between current strategies, projects and initiatives demonstrate that the goals are also achievable. While progress towards achieving the PWDGs varies greatly across countries, all countries – regardless of economic status – have reported some degree of alignment with this global structure indicating strongly that implementation of the PWDGs is feasible and adaptable to local needs.

1.5 An understanding of how to evaluate the impact of the pharmaceutical workforce is necessary, yet generally missing from the research literature. A hybrid model is presented as a first step in stimulating a research discussion on impact measurement and experts and researchers should begin to develop critical thinking in this area, particularly a more focused report on evaluation methodology.

1.6 The pharmaceutical workforce needs to be continually monitored and assessed in order to evaluate various capacity challenges; however further work is also needed to develop professional, economic and disease indicators to better describe the impact of the pharmaceutical workforce. Academic capacity in particular, and the training of the next generation of scientists and teachers, is an essential component of these workforce intelligence objectives.

1.7 The literature on leadership development in pharmacy is under-researched and little is known about the global status of pharmacy leadership strategies; paradoxically, leadership development remains a challenge, and concerted action is required to drive evidence-generation in this area. Country-level leadership bodies should ensure the creation of clear and accessible leadership development programmes and opportunities for their pharmaceutical workforce; this report provides good examples where this has been the case. Additionally, implementation of leadership development strategies should integrate with other aspects of workforce development such as academic capacity, workforce diversity and equality, and quality assurance.

1.8 Educational research and evaluation agenda in pharmacy needs strengthening and it is clear that better ways of evaluating the impact of technology-driven education need to be developed and used more routinely by education providers.

1.9 This report provides a starting point for describing our current global baseline in a broad context of workforce and educational development. Similarly, within the context of a valid global vision for transforming the workforce we should be identifying our current position, across all of the PWDGs, in order to plan for structured collective development.

1.10 It is also clear that for some PWDGs, there is a wider gap in relation to others; workforce gender and diversity policy formation have less traction than, for example, competency development or continuing professional development strategy development.

[a] - Global Vision for Education and the Workforce. Presented at the Global Conference on Pharmacy and Pharmaceutical Sciences Education. Available from: http://fip.org/educationreports

[b] - Pharmaceutical Workforce Development Goals. Presented at the Global Conference on Pharmacy and Pharmaceutical Sciences Education. Available from: http://fip.org/educationreports

1.11 It has also become clear (and noted in previous FIP*Ed* reports) that terminology describing workforce and education is in danger of becoming confusing. A database of terminology would be able to identify and describe points of equivalence within the global workforce lexicon.

1.12 In conclusion, the country case studies show that there is high alignment between current global strategies and the PWDGs which creates a tangible context of relevance and usefulness for global workforce transformation; this initial evidence supports the notion that the FIP*Ed* vision and PWDGs are what they are intended to be: measurable, feasible and achievable. Leadership bodies and member organisations should consider the incorporation of this global structure for meaningful national workforce development and progression.

PART 1

INTRODUCTION AND BACKGROUND

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1.1 Why focus on research, development and evaluation?

The UN Sustainable Development Goal (SDG) 3 makes a universal commitment to: "Ensure healthy lives and promote well-being for all at all ages".[1] To meet this health goal, progress must be made towards achieving its underlying targets in the years leading up to 2030. One particularly critical health target addresses the global health workforce and calls to:

> "Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States."

The importance of this target is reflected in the major initiatives led by global agencies to advance the health workforce development agenda. The World Health Organization (WHO) Global Strategy on Human Resources for Health: Workforce 2030 was developed to advance progress towards the UN SDGs and universal health coverage (UHC) by ensuring equitable access to health workers within strengthened health systems.[2]

Significant challenges stand in the face of ensuring equitable access to health workers by all. The continuously rising demand for scaling up the health workforce around the world, coupled with the projected shortages of 18 million health workers in low- and middle- income countries,[3] led to the establishment of the High-Level Commission on Health Employment and Economic Growth (the Commission) by the United Nations (UN).

The UN Commission, charged with proposing actions to stimulate investments in human resources for health (HRH), made ten recommendations to transform the health workforce to achieve the 2030 Sustainable Development agenda.[4] The recommendations present ambitious change-enabling solutions that focus on transformative investments in the health workforce. The WHO partnered with the International Labour Organisation (ILO) and the Organisation for Economic Co-operation and Development (OECD) to support the implementation of the UN Recommendations.

The outcome of this tripartite collaboration is Working for Health: A Five-Year Action Plan for Health Employment and Inclusive Economic Growth (2017–21).[5] The Five-Year Action Plan, discussed and adopted at the 70th World Health Assembly, demonstrates how ILO, OECD and WHO will respond to each recommendation with a set of Deliverables that will support Member States in translating these recommendations into actions.

Research, development and evaluation mechanisms are central to the effective implementation of the UN Recommendations as well as the WHO Global Strategy on HRH. The 10th UN Recommendation calls on national, regional and global initiatives to:

> "Undertake robust research and analysis of health labour markets, using harmonized metrics and methodologies, to strengthen evidence, accountability and action."

To implement this recommendation, the WHO-ILO-OECD describe the need for a establishing a strategic research plan and expanding an evidence base to inform health workforce investment strategies through the following Deliverable:

> "A health workforce research agenda established, research methodologies advanced, and evidence base expanded for decent work and effective health labour market interventions that optimize the socioeconomic returns on health workforce investments."

Transforming and scaling up all health workforces and their education and training relies on well-coordinated, needs-based research, development and evaluation strategies designed for implementation on a national-level.

1.2 Why is this important for pharmacy?

As medicines experts, the pharmaceutical workforce[c] plays a key role in improving health outcomes through responsible use of medicines and optimising effective choice and use. Investing in the development of an adaptable, flexible, competent and well-distributed pharmaceutical workforce contributes towards achieving UHC, SDGs and strengthening health systems. Transforming the global pharmaceutical workforce requires a global vision with clear and consensus-based objectives consistent with global health strategies.

The International Pharmaceutical Federation (FIP), as the global professional leadership body representing over 4 million pharmacists and pharmaceutical scientists around the world, has developed a transformative workforce roadmap adopted at the Global Conference on Pharmacy and Pharmaceutical Sciences Education held in Nanjing, China, on 7 and 8 November 2016. The workforce roadmap sets out the desired milestones for education and workforce development of the pharmaceutical workforce, clearly linked with a global vision for transforming pharmacy and pharmaceutical sciences education.

Following an extensive consensus-based consultation process, three milestone documents were adopted at the global conference. The documents are presented and described in a full report of FIP's global conference, "Transforming pharmacy and pharmaceutical sciences education in the context of workforce development", published in May 2017.[6] The three principal outcomes are:

1. **A Global Vision for Education and Workforce** that provides a description of the future directions of our profession and how education can support the progression of medicines science and practice.

2. **A set of Pharmaceutical Workforce Development Goals (PWDGs)** which aim to facilitate national implementation of the Global Vision and roadmap through a series of measurable, feasible and tangible goals (listed in Annex 1).

3. **A set of Statements on Pharmacy and Pharmaceutical Sciences Education ("the Nanjing Statements")** that describe an envisioned future for progressive professional education, to enable the further enhancement of pharmaceutical education standards worldwide.

FIP set the roadmap to transform the global pharmaceutical workforce through education. The Global Vision, PWDGs and Nanjing Statements are intended to provide strategic support to member organisations in strengthening their capacity to develop education in the context of workforce development to ensure that optimal drug therapy-related patient care is delivered and health outcomes are improved.

Moreover, drug expenditure and health-related costs are under close scrutiny by governments and the population in general, as patient demands and health needs have grown exponentially, accompanied by an increase in the number of new medicines and the indications for which they are used. Margins over the price of drugs have been decreasing as a result of governments' efforts to contain increasing drug expenditure costs, and pharmaceutical professional associations and leadership bodies have been driving negotiations for payment for pharmaceutical services. However, pharmaceutical care is yet to become a part of everyday practice for most pharmacists, as it requires fundamental changes in practice, education and regulation – and these changes are still not occurring at the required pace.

Research has proven the value to patients and healthcare systems of a range of pharmaceutical services. Now that pharmacists have advocated for a wider scope of practice, the society will ultimately hold pharmacists accountable for delivering these expanded healthcare services. As the professional and economic future of pharmacy lies in the ability of the workforce to deliver quality care related to medicines use, it is imperative to invest in an education that would transform the workforce into competent health professionals prepared to fully transition from a product and dispensing-focused environment to a practice that revolves around delivering patient-centred services which would ultimately positively impact patient and population health outcomes. To achieve this transformation, an integrated and concerted multi-stakeholder effort is needed to build a capable and adaptable workforce.

FIP, under the aegis of FIP*Ed*, is committed to supporting all stakeholders in translating the Nanjing outcomes into actions, particularly the PWDGs. The PWDGs have been developed as a measurable, feasible and tangible means to activate and give purpose to the Global Vision. They will provide action-oriented workforce planning and ways of monitoring progress towards global achievement of the workforce vision.

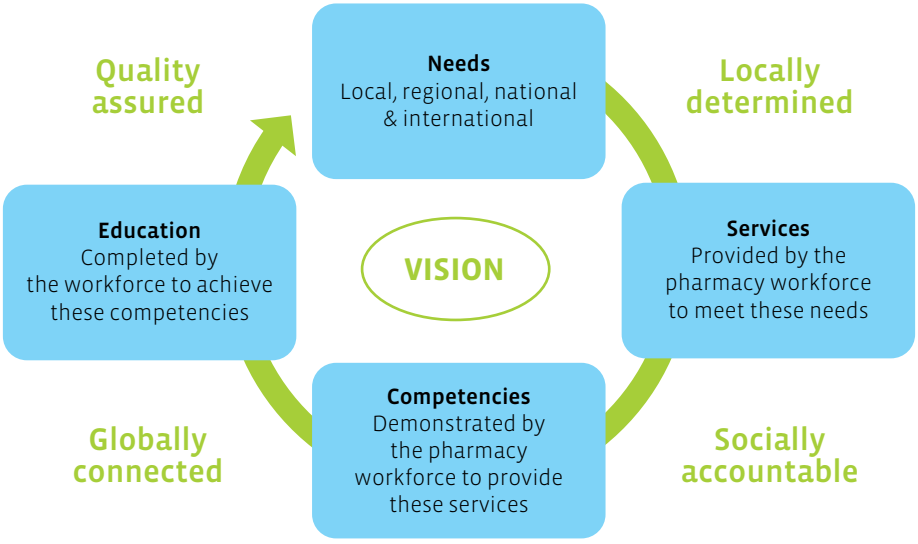
Crucially, they will provide consistent structure for coherent and comprehensive national workforce development actions that are in line with global health workforce strategies. The PWDGs are highly aligned with the WHO Global Strategy for HRH, the UN Commission Recommendations and the WHO-ILO-OECD Five Year Action Plan (Annex 2). By adopting the PWDGs, nations would be working towards implementing global health workforce development goals in the pharmaceutical context.

As the education arm of FIP, FIP*Ed* has pioneered in developing tools and resources intended to enable worldwide action to advance and transform the global pharmaceutical workforce through education. The tools, listed in Annex 3, are designed to be locally adaptable to meet the specific needs and priorities of the nation or region. FIP advocates for the consistent use of a needs-based approach to education, emphasizing the formation of linkages between pharmaceutical education with population health needs. The FIP "needs-based education" model supports the notion that pharmaceutical education should be locally determined, socially accountable, globally connected, and quality assured to meet the given health needs of communities (Figure 1.1).

Just as investing in the world's health workforce is a global imperative, investing in its pharmaceutical workforce is also a priority. With the release of various global health workforce strategies and the adoption of a new roadmap for the pharmaceutical workforce, FIP*Ed* is committed now more than ever to support the implementation of these development strategies on a national, regional and global level.

[c] - Pharmaceutical workforce refers to the whole of the pharmacy related workforce (e.g. registered pharmacist practitioners, pharmaceutical scientists, pharmacy technicians and other pharmacy support workforce cadres, pre-service students/trainees) working in a diversity of settings (e.g. community, hospital, research and development, industry, military, regulatory, academia and other sectors) with a diversity of scope of practice.

Figure 1.1: FIP Needs-based educational model.



1.3 What is the purpose of this report?

Research, development and evaluation mechanisms are integral to achieving the UN Recommendations and the tripartite Five Year Action Plan for human resourced for health. The high alignment of the PWDGs with these global strategies make research, development and evaluation strategies an equally important consideration for implementing the pharmaceutical workforce development agenda.

In light of this, understanding the current global trends in research, development and evaluation and identifying knowledge gaps, drivers and opportunities for future work is clearly important. This report therefore aims to discuss and share global research, development and evaluation strategies to support member organisations in the effective implementation of the pharmaceutical workforce development roadmap.

In Part 2, global research, development and evaluation strategies collected from 21 countries around the world are presented; real examples of PWDG-linked national strategies, projects and initiatives are provided to enable stakeholders to adopt the PWDGs in their own context using practical and adaptable approaches and mechanisms from other countries.

Part 3 features expert briefs that summarise progress, highlight knowledge gaps and explore future research, development and evaluation agendas for a number of PWDG-themed topics, including: academic capacity, workforce impact, leadership, and workforce intelligence. The briefs highlight priorities for future research activities to progress implementation towards the PWDGs.

Part 4 is dedicated to discussing research and development in the context of technology-driven education, highlighting various important technological methods used in education, and the impact of developed tools and platforms on workforce development.

A final summary of trends and call to action for stakeholders conclude the report in Part 5.

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PART 2

PROGRESS TOWARDS THE PHARMACEUTICAL WORKFORCE DEVELOPMENT GOALS (PWDGS)

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2.1 Introduction

Following on from the Global Conference on Pharmacy and Pharmaceutical Sciences Education, FIP*Ed* is committed to support Member Organizations utilize the key outcomes to develop the global pharmaceutical workforce in the context of education and training.

To this end, FIP*Ed* has conducted a global call for case studies to identify and share examples of national-level research, development and evaluation strategies in pharmaceutical education and workforce development. In this report, we aim to highlight the alignment of national development projects with the PWDGs and better understand the various national policies and mechanisms in place, to assist FIP member organisations and all pharmacy stakeholders to transform their pharmaceutical workforce through implementing the PWDGs.

The purpose of the case studies is to provide a global snapshot of how the PWDGs are aligned with national strategies on pharmaceutical education in different countries and identify national priorities moving forward; this will assist in the development of global pharmacy education policy recommendations and further resources.

2.2 Method

Case study template questions were drafted and peer-reviewed internally within FIP*Ed*. The template was then sent to two contacts from member organisations to pilot the questions. Comments on clarity of the questions and response options available were received and changes were made accordingly.

The case study template consisted of three main questions. The first requested authors to provide a summary of key strategic projects developed or under development in their country. The second question asked contributors to identify national strategies, projects or initiatives aligned with the PWDGs. The final question asked authors to identify key PWDGs that are priorities for the next five years.

A call for case studies was sent to all FIP member organisations and FIP*Ed* contact lists between April and June 2017. Reminders were sent twice and a total of 23 submissions spanning 21 countries were received. Table 2.1 lists the 21 countries, grouping them by World Health Organization (WHO) region. All WHO regions are represented in the responses with the exception of South East Asia; the majority of the cases originate from Africa (n=7) and the Americas (n=6). Multiple submissions from the same country were merged. Responses were assessed, thematically grouped and presented descriptively.

Table 2.1: Case study respondent countries by WHO region.

WHO Region	Countries
Africa	Ghana; Kenya; Namibia; South Africa; Uganda; Zambia; Zimbabwe
Americas	Argentina; Brazil; Chile; Costa Rica; Paraguay; United States of America
Eastern Mediterranean	United Arab Emirates
Europe	United Kingdom; Portugal
Western Pacific	Australia; China; Japan; Malaysia; Singapore

[d] - A full list of co-authors affiliations is available in Annex 4.

2.3 Results and discussion

2.3.1 Summary of global strategies alignment with the PWDGs

The case studies collected data on national-level research, development and/or evaluation strategies and projects mapped with the PWDGs. These included existing, under-development or planned projects. While strategies were reported across all PWDG themes, the extent of global mapping varies across the goals. Figure 2.1 shows, for each PWDG, the total number of countries reporting a mapped strategy or project.

For example, PWDGs 3 (Quality assurance), 7 (Service provision) and 8 (Working with others) are among the most highly mapped across the 20 countries' strategies. Conversely PWDGs 10 (pharmaceutical workforce gender and diversity balance) and 11 (workforce impact and effect on health improvement) are among those least mapped in the reporting countries' strategies.

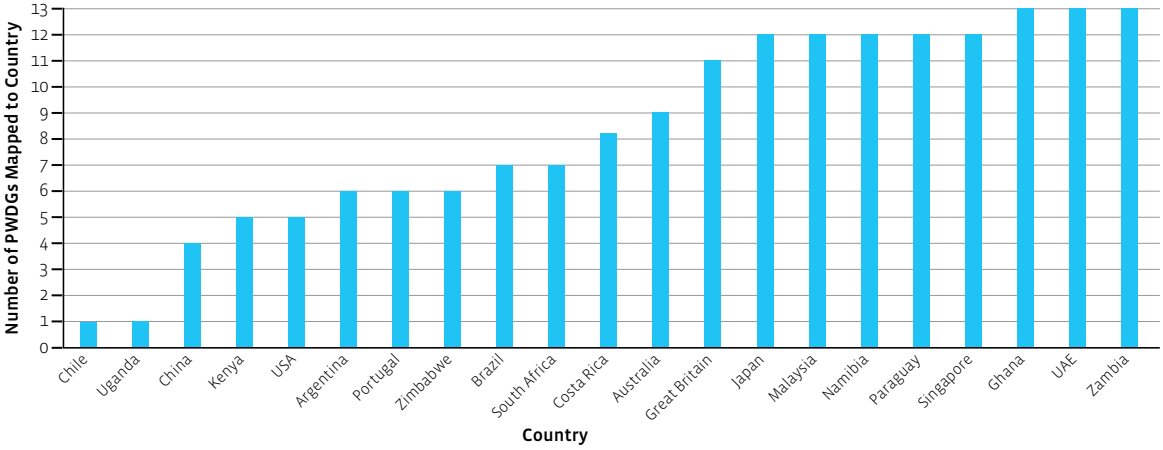
Figure 2.1: PWDG mapping with country strategies spanning 21 countries.

The level of PWDG-strategy alignment also varies across countries. Figure 2.2 summarises the reported alignment per country. It is important to acknowledge that, because case study authors report country information to the best of their knowledge, the potential inaccuracy of information is a real limitation.

For this reason, quantitative analysis of the data is best avoided. These numbers may, however, serve to provide as general indicators of the level of PWDG-strategies alignment.

The following section describes the global trends in research, development and evaluation strategies per PWDG and identifies common and recurring themes.

Figure 2.2: Strategies alignment with PWDGs per country.



2.3.2 Case studies and global trends in research, development and evaluation strategies

PWDG 1: Academic capacity

Focus on the academic workforce

For academic capacity, a number of the strategies reported a strong focus on the academic workforce. For example, **Costa Rica** has put in place strategies targeting the improvement of the teaching process through congresses, meetings, workshops and professional development opportunities. The latter can be exemplified by the University of Costa Rica's five-year post-graduate education plan for its faculty members. The University of Medical Sciences has also put in place strategies to increase retention and recruitment of full-time teaching staff.

Governmental scholarship schemes in **Malaysia** allow practicing pharmacists and academics to further their studies (Master's and PhD degrees) in areas such as clinical pharmacy, social and administrative pharmacy and the pharmaceutical sciences. In addition, mechanisms to encourage the engagement of practicing pharmacists in research are reported. Research weeks and conferences are organized at state and national levels; and, increasingly, pharmacists are joining research teams in clinical research centres across the nation.

In **Zambia**, national-level initiatives to develop research in both the academic workforce and student body are reported. Academics are encouraged to participate in collaborative national research projects, and arrangements are in place through organised student research projects.

Regular meetings promoted by **Brazil**'s Federal Council of Pharmacy gather clinical educators to share best practice experiences and methods. Pharmacy educators are also engaged in governmental projects of workforce development for the public health system, such as the inter-professional Residency Program. These projects are intended to enhance the institutional capacity to offer professional training and increase engagement between the educational sector and the health system. Academics and students have also been engaging in discussions with professional organizations to formulate new proposals for pharmaceutical educational regulations, such as the new Pharmaceutical Education Guideline.

Some countries reported challenges faced with regards to developing the academic workforce. **Ghana** reported that while experiential training has been fully integrated into the pharmacy programmes, the academic workforce's current capacity to participate in this training programme is still suboptimal. In **South Africa**, strategies for academic capacity are reportedly underdeveloped, despite this being a critical area that requires urgent attention and priority-setting. Reported barriers include budgetary and resource constraints, and lack of strategies addressing the difficulties experienced in attracting and retaining suitably qualified academics.

Strategy integration

Extensive national frameworks and policies are in place in **Japan**. The frameworks address the standards of core curricula, guidelines for undergraduate training, as well as a consultation programme for evaluating the quality of pharmacy graduates. A Vision document for pharmacists' professional abilities and contributions to society in the future intends to provide a baseline of initial pharmaceutical education, lifelong learning, and specialist pharmacists based on expected roles of pharmacists in team-based healthcare in the future; this is intended to guide the development of robust national model curricula and career pathways.

The professional association and the regulator are both driving academic capacity strategies in the UK's **Great Britain**. The Royal Pharmaceutical Society's (RPS) Vision for Transforming the Pharmacy Workforce in Great Britain ("the RPS Vision") emphasises the role of leadership development as part of capacity building, stipulating that all pharmacy students should have ready access to leaders in pharmaceutical science, policy and clinical practice to act as role models. In addition, the Society's Roadmap to Advanced Practice supports the early professional development of pharmacy students and trainees. The UK regulator, the General Pharmaceutical Council, developed 'Standards for the initial education and training of pharmacists' for schools of pharmacy. The integration of clinical placements with the undergraduate pharmacy programme is also being evaluated for enhancing the academic capacity and training experience.

It is interesting to note that in **China**, there is variance in the form of entry-level education between universities. Some pharmacy schools offer entry-level degrees with a pharmaceutical sciences focus, and others teach programmes a clinical practice focus. Other universities opted for a combined track that provides a general education in both areas.

Impact of capacity building

Kenya's Diploma and Internship programmes facilitate needs-based capacity building by targeting early career pharmacists. These programmes are specifically aimed at educating Kenyan pharmacists on how to advance clinical pharmacy by using local care programmes. By implementing the Diploma program, Moi Teaching and Referral Hospital has increased

the number of clinically trained pharmacists from 2 in 2011 to 13 in 2017 with a potential impact on more than 7500 patients annually. This increase will further support the growth of this programme and the experiential opportunities in local practice sites provided to future students. The development of this programme is also helping to establish Moi Teaching and Referral Hospital as a Centre of Excellence in Clinical Pharmacy in Kenya.

Academic capacity and national higher education policies

Paraguay's National Agency for the Evaluation and Accreditation of Higher Education established a national profile of pharmaceutical services, which describes the skills and attributes that students are expected to have upon graduation. It is an essential reference used for curricular design and review, teaching management and for the evaluation and accreditation purposes. Pharmaceutical education standards in the **United Arab Emirates** also largely rely on national higher education and accreditation standards.

Multi-sectoral engagement

In **Singapore**, a single pharmacy education institution exists at the National University of Singapore (NUS). This provides room for high engagement between the school, the pharmaceutical body and the health ministry. The three bodies work closely together on needs-based curricular development and ensuring that graduates have the foundational knowledge and skills needed. The Ministry of Health invites senior faculty members from NUS's pharmacy school to participate in national strategic planning events and to facilitate dialogue among policy makers, educators and practitioners. Multi-stakeholder engagement is evidenced in **Zimbabwe** as well. The Zimbabwean Pharmacists' Council plays a key role in the curricular review for the University of Zimbabwe. Similarly, members from the University's academic faculty as well as the national higher education agency are key stakeholders in the Council.

Portugal's Pharmaceutical Society established a Commission that is charged, among many tasks, with collaborating in the development of the professional and scientific education plan of pharmacists. This collaboration is largely done with the national higher education accreditation body. **Namibia** also reports that there is engagement between academic institutions and stakeholders in government, industry, and regulation to develop new educational programmes.

Argentina's Pharmaceutical Federation set up a National Committee for Certification and Pharmaceutical Recertification that aims to assess the skills, behaviours and attitudes of pharmacists. While certification is not mandatory, it is a considered a formal, public recognition of the education and training received by pharmacists, bridging between education and practice.

PWDG 2: Foundation training and early career development

Structured and competency-based training frameworks

Some countries describe structured and competency-based training frameworks that underlie foundation training and early career development of the pharmaceutical workforce. **Australia**, for instance, describes a Hospital Pharmacy Residency Programme where experiential learning with structured feedback is critical for newly registered professionals to consolidate their formal academic education and apply this knowledge in real and complex workplace settings. In 2017, The Society of Hospital Pharmacists of Australia introduced a national, structured, and formalised the Residency Programme for pharmacists in their foundation years, or for pharmacists entering hospital practice but with experience in other practice settings. Through the two-year programme, residents rotate through a diverse programme curriculum, ensuring they gain the skills and knowledge necessary for competent general level pharmacists. Evaluation, feedback, and reflection are integral components of the programme.

Singapore established a national competency framework for entry to practice pharmacists. It also revised the national pre-registration training model into 4 rotations of 3 months each; with 2 essential rotations in acute care and community care and another 2 elective rotations that can be selected from regulatory agency, pharmaceutical company, or specialty institutions. First year post-graduation, there is a Pharmacy Residency (PGY1) training of 12 months to be completed.

The Pharmacist's Council of **Zimbabwe** has published comprehensive guidelines for pre-registration training for the pharmaceutical workforce including pharmacy technicians. The guidelines for pharmacists, for example, include checklists and logbooks for expected competencies. These competencies are aligned with the national 'Professional Competency Statements For Entry Level Pharmacy License Applicants'. In **Ghana**, all newly qualified pharmacists are registered onto a provisional register of pharmacists until after successful completion of a mandatory 12-month post registration training.

A nationwide 1-year pre-registration programme is compulsory for a pharmacy graduate to become a registered pharmacist in **Malaysia**. This pre-registration programme can be done in premises approved by the Ministry of Health (MoH). The Pharmaceutical services division of MoH publishes the guidelines for the pre-registration programme and supervises its implementation. At the completion of the programme, the interns must submit their portfolios (log-books) and

be assessed by a team of preceptors. All candidates must also pass the forensic (pharmacy law and regulatory) exam. Following the completion of the pre-registration training, pharmacists are required to continue working in accredited pharmacy premises in order to complete their registration process. This is called "1 year compulsory service" and is intended to ensure that early career pharmacists gain sufficient experience before becoming a full-fledged pharmacist who can work independently.

Linkages with continuing professional development

It is interesting to note that some countries reported on their continuing professional development (CPD) strategies as demonstration of progress towards PWDG2: Foundation training and early career development – illustrating the importance of CPD programmes in supporting the early career development of the pharmaceutical workforce. **Costa Rica**, for example, reported how one national university, the University of Costa Rica, developed a continuing education programme for its pharmacy faculty members to support them throughout their career progression. The University of Medical Sciences, also in Costa Rica, established a Centre for the Development of Pharmaceutical Initiatives (CEDIFAR), which supports the development of continuing education and the development of advanced education programmes.

The **United Arab Emirates** demonstrates how this PWDG is being achieved through two national strategies. One is through a government-led CPD programme for the country's health workforce, including pharmacists. The programme offers a comprehensive array of CPD opportunities (e.g. accredited events and online resources). Additionally, the National Strategy for Innovation calls for planning innovation-nurturing initiatives in both education and research, which includes designing effective internship programmes for health workers training and early career development.

Supporting transition to advanced practice

In **Great Britain**, the RPS Vision stipulates that all newly qualified pharmacists will have access to foundation support, training and development to enable and assure their professional development during their early career. In addition, the RPS Roadmap to Advanced Practice and the RPS Foundation Programme provide a structure for professional development for new pharmacists – those in their first 1000 days of practice. Principles for Foundation training are aligned to the Faculty (professional recognition programme for advanced and specialist pharmacists), thereby facilitating seamless transition towards advanced practice. Pharmacy graduates are required to complete a 52-week pre-registration training regulated by the General Pharmaceutical Council. The Council set out outcomes expected from trainee pharmacists in 'Future Pharmacists: standards for initial education and training of pharmacists'. The Council also oversees the training of pharmacy technicians.

Integrated PWDG2 strategies that support transition into advanced practices is also reported in **Australia**, where the Hospital Pharmacy Residency Programme (described earlier under PWDG1) comprises a consistent set of competency targets designed for residents to achieve performance against the Australian Advanced Pharmacy Practice Framework (APPF), at Advanced- Stage 1 (transition level) by the end of their residency, and then continue their professional development pathway aligned with the APPF.

While **China** did not report having a structured advanced training framework that pharmacists can transition into from early career, the country does have offer post-licensing 'training' opportunities for new pharmacists. For example, in Beijing, there is a system in place for early career pharmacists to train for 5 years; some pharmacists train to become clinical pharmacists during that time.

Strategy development through international collaborations

Japan's primary pharmaceutical association (JPA) is working closely with the RPS in the UK on a Collaborative Programme that aims to develop foundation-level competency frameworks for pharmacists in Japan based on validated and utilized frameworks in Great Britain. This provides opportunities to develop a synergetic professional recognition model for pharmacists between the UK and Japan. In addition, the a pharmacy Vision statement in Japan provides a baseline of initial pharmaceutical education, lifelong learning, and specialist pharmacists based on expected roles of pharmacists in team-based healthcare in the future. This is intended to enable smooth transitional pathways for initial to early career development of pharmacists.

Needs-based programmes to serve the local population

In **Kenya**, a pre-registration Clinical Pharmacy Internship Programme and a post-registration Clinical Pharmacy Diploma Programme are aimed at building foundational infrastructure and also paving the way for more developed post-graduate training programmes. Participation in both programmes is intended to increase involvement in clinical pharmacy activities to help participants develop first-hand knowledge of how to provide clinical care services. Interns and Diploma students are partnered with currently practicing Kenyan clinical pharmacists to provide career path mentorship and guidance on how to build further clinical pharmacy care programmes across Kenya.

Not unlike Kenya, **South Africa** makes it mandatory for the first year post-internship to be spent performing community service. In general, the principle is that these young pharmacists should work in a public sector facility in an underserviced rural area. The new pharmacist is sometimes the first pharmacist appointed to a facility, and is aslo often the only pharmacist employed in the facility. The programme has, however, encountered difficulties because of the lack of

funded posts in the areas that need services the most. The National Department of Health has therefore reviewed the situation and is now entering into agreement with private sector pharmacies. There is no programme in place for foundation training at this stage.

Analysing pharmaceutical services and needs first

Paraguay conducted an in-depth analysis of pharmaceutical career progression at the national and regional levels. As a result, the professional profile for pharmacists in Paraguay was developed to meet the demands of society and to establish the professional skills required to face the multiple health service challenges.

Focus on the pharmaceutical industry

Zambia reports that training and early career development is highly linked with demonstrating competence in the industry sector. A wide range of skills are important to gain during the primary and advanced training of pharmaceutical personnel. These skills include pharmaceutical technological and engineering techniques in pharmaceuticals production process knowledge such as product quality control and monitoring, in-process and end-product quality control & monitoring, and drug strategic storage conditions and techniques.

In **Namibia**, the in-country training of pharmacists and pharmacy technicians not only works towards developing the workforce, but also reportedly stimulates the economy towards industrialization.

PWDG 3: Quality assurance

Pharmacy quality assurance changes linked to broader health workforce planning

The Australian Pharmacy Council (APC) is the independent Accreditation Authority for pharmacy education and training in **Australia**. APC plays a key role in protecting the public safety by ensuring high standards of pharmacy education, by accrediting and monitoring education programmes, assessing overseas trained practitioners and conducting examinations on behalf of the Pharmacy Board of Australia. Australia's accreditation system for registered health practitioners is undergoing an Independent Review of Accreditation Systems within the National Registration and Accreditation Scheme for health professions. The focus of the Review is threefold: to propose improvements to the system within the existing framework; to ensure the relevance and responsiveness of health education; and to ask the broader question of 'how can education and training, and its accreditation, help create the workforce that Australia needs, both now and in the future.' Should Health Ministers determine that an amalgamated single accreditation authority for all regulated health professions be implemented, the APC profession-specific regulatory activities may be lost. The Australian pharmacy profession believes it is important that, to ensure public safety in relation to the registration and accreditation standards of pharmacy, the profession does not lose control of the high quality and standards that have been achieved to date by the APC. The PWDGs and the Nanjing Statements have reportedly assisted the Australian pharmacy profession in this regard.

National higher education quality assurance systems

Brazil has a public, transparent and well-structured system to evaluate the quality of pharmacy education and to assess universities capacities to offer pharmacy courses. This system includes in loco evaluation of the infrastructure of the university and the school of pharmacy, and students´ performance exams. The National Health Council (that represents government and society in public health governance) is planning to evaluate the health needs before allowing the establishment of new schools of pharmacy.

Accreditation of pharmacy courses in **Argentina** is based on the standards of the National Commission of Evaluation and University Accreditation. Courses that are not accredited by the Commission cannot offer to teach pharmacy. Similarly, **Costa Rica**'s pharmacy education programmes are accountable to the standards of the country's National Accreditation System.

The quality assurance mechanism of pharmaceutical education in **Japan** is also overseen at the national level by the education ministry's accreditation mechanisms. The evaluation and accreditation process allows for engagement with higher education institutions and academic leaders to support national workforce development agendas.

Kenya's Clinical Pharmacy Internship Programme and Clinical Pharmacy Diploma Programme were developed based on national standards and the Diploma programme has received accreditation by national regulatory agencies. National standards and participant feedback are used to make continued changes to these programmes to ensure they address the professional skills expected by graduates.

Following the recent development of quality assurance systems, namely those in the European area, the government in **Portugal** established the Agency for Assessment and Accreditation of Higher Education (A3ES) with the purpose of promoting and ensuring the quality of higher education. A3ES conducted a recent national evaluation of pharmaceutical sciences degrees across all schools of pharmacy.

This evaluation comprises a number of factors: the quality of teaching, considering the syllabus and the curricular units, the laboratory facilities, the physical structure of the institutions and the qualification of the teaching staff, to name a few. The standards are established according to the European Union. A report will be issued describing the Agency's decisions.

In the **United Arab Emirates**, the Commission for Academic Accreditation (CAA) of the Ministry of Education conducts a programme of licensure of institutions of higher education and accreditation for each of their academic programmes – including pharmacy degrees. The CAA published a new edition of the Standards for Licensure and Accreditation in 2011 where it refined its existing standards and procedures to ensure that newly established institutions and programmes, as well as existing ones, meet high levels of quality.

Pharmacy-specific quality standards

In **Chile**, the undergraduate pharmacy academic programme was one of the first to voluntarily undergo evaluation of its quality. In 2000, an advisory committee made up of members representing the National Accreditation Commission, pharmacists from representative areas of professional practice, and academic representatives of public pharmacy schools at that time, was responsible for establishing the first Criteria and Standards for the evaluation of pharmacy schools. Its work was guided by recommendations of the Pan American Health Organization and the World Health Organization (PAHO/WHO) regarding the content of the curriculum. Since then, the accreditation criteria have not been updated, in spite of significant changes in Chile regarding the more active role of the pharmacists in the society (e.g. National policy of medications on the Health Reform), and availability of key documents on quality assurance of pharmaceutical education at a regional level (e.g. Accreditation Standards for Pharmacy programmes in Latin America: A proposal) and global level (e.g. Quality Assurance of Pharmacy Education: the FIP Global Framework).

Another ongoing development in Chile demonstrates the intersection of academic research and national strategy development. It describes a large-scale research project undertaken by the pharmacy school at Universidad de Valparaíso; the project aims to re-examine accreditation criteria and standards for Pharmacy programmes in Chile, by comparing the quality assessment model of Chile's pharmaceutical education programmes with regional and global reference frameworks. The project is titled "A comparative study of the quality assessment model for Chilean pharmaceutical education programmes, with both regional and global frameworks, for an up to date proposal." The study is composed of 5 stages: selection of reference documents, analysis of reference documents, validation of the analysis carried out, proposal and dissemination.

The results are expected to produce a new document for assessing quality assurance of pharmaceutical education at a national level and would become a milestone for Chilean higher education; it may also serve as an example for global pharmacy schools wishing to conduct research to evaluate accreditation standards for pharmacy education.

The General Pharmaceutical Council is responsible for setting and regulating the education and training requirements for pharmacists and pharmacy technicians in **Great Britain**. In addition, the professional leadership body, the RPS Vision states that "Evidence-based quality indicators are essential in the education and training of pharmacists to ensure all involved continually strive for excellence". In addition, the quality of the RPS Foundation Programme and the Faculty is overseen by a strategic Board with three quality assurance panels for accreditation, curricula and credentialing.

Paraguay's National Advisory Commission established standards for basic pharmacy curricular contents, practical training, as well as the professional activities reserved to those who obtain the title of Pharmacist and/or Pharmaceutical Chemist in order to harmonize their training at national and regional level.

South Africa's quality assurance mechanism is achieved by regular monitoring of educational institutions by the Pharmacy Council, and by the periodic development of the pharmacy qualification. During the development process, the Council engages in both narrow and wide consultation within the profession.

Joint accreditation process between multiple sectors

Malaysia reported having a joint accreditation of pharmacy programmes (especially for undergraduate programmes) by the Malaysian Qualification Agency (MQA) and Pharmacy Board of Malaysia (PBM). The accreditation is based on standards developed jointly by the MQA and PBM together.

In **Namibia**, all educational programmes as well as facilities in Higher Education Institutions undergo a rigorous process of quality assurance by an in-house quality assurance unit, a health regulator (Health Professions Councils of Namibia), a national qualifications registration body (Namibia Qualifications Authority), and an educational regulator (National Council for Higher Education).

Zimbabwe's pharmacy council inspects training institutions every 3 years to ensure quality of pharmacy education. The Ministry of Health and Child Care and the Taskforce on Quality Assurance for Pharmaceutical Development engage with members from the Schools of Pharmacy and pharmacy technician colleges to ensure quality of pharmacy education.

Quality assurance linked to student performance and registration requirements

In **Ghana**, internal quality assurance mechanisms in pharmacy schools regularly assess quality through both theory and oral examinations. Final year students take a mandatory end of programme examination and successful candidates undertake a 12-month pre-registration internship before sitting for the Ghana Pharmacy Professional Qualifying Examination. Successful candidates become eligible to be registered onto the provisional register of pharmacists. Ghana also reports that there is strong collaboration between the Pharmacy Council and the National Accreditation Board, but that self-assessment systems require further strengthening in the pharmacy training institutions.

China reported how licensing examinations are used as a form of quality assurance. All Beijing pharmacists who have completed their training (which ranges in length depending on area of practice) would have to successfully pass two examinations to ensure they are prepared to practice as pharmacists.

Quality assurance of lifelong learning

While the quality assurance of foundational education in **Japan** is regulated by the education ministry, the quality assurance of pharmacy lifelong learning programmes is overseen by the Council on Pharmacists credentials which provides evaluation criteria to maintain the quality of pharmaceutical education in Japan. The evaluation and accreditation process engages with lifelong learning programme providers and specialist pharmacist training providers to support national workforce development agendas.

The **United Arab Emirates** Ministry of Health, together with local health authorities, accredit continuing professional development programmes.

Quality assurance mechanisms under development

Singapore is in the process of Establishing National Standards for Undergraduate Pharmacy Education and Training; and **Zambia** reports that establishing a quality assurance system would provide the pharmaceutical trainees with the necessary skills development pathways.

PWDG 4: Advanced and specialist expert development

National professional recognition models and policies

In **Great Britain**, the RPS Roadmap to Advanced Practice outlines three principal career pathways (Pre-Foundation, Foundation and Faculty) for pharmacists and pharmaceutical scientists and describes the available support and development at different stages of practice. The Roadmap describes the principles of the Faculty, a professional recognition programme for advancement as a generalist and specialist. Furthermore the RPS Knowledge Interface Tool enables pharmacists to access validated knowledge components for specialist career pathways. The RPS Vision also describes how "Pharmacists will have demonstrated their skills, knowledge, and practice using RPS standards and professional development frameworks in all care settings and for the ultimate benefit for patients". In addition to the advanced generalism model offered through the Faculty, pharmacists in Great Britain can become independent prescribers – a process regulated by the General Pharmaceutical Council.

Japan's Vision document provides a baseline of initial pharmaceutical education, lifelong learning, and as well as specialist pharmacists based on expected roles of pharmacists in team-based healthcare in the future. This enables seamless transition from initial to early career levels, and onto advanced and specialist expert development. In addition, the collaboration between the Japan Pharmaceutical Association and the RPS, aims to enhance CPD support systems for Japanese pharmacists; the project will develop an advanced-level competency framework using existing frameworks in the UK.

Portugal's Pharmaceutical Society regulates five formal pharmaceutical specialisations: hospital pharmacy, pharmaceutical industry, regulatory affairs, clinical analysis and human genetics. All these specialisations were created under the advice of the Society's Council for Qualification and Admission (CQA) and further developed by each of the Specialist Boards respectively. Each candidate must submit evidence of 4-5 years of practice, with training in different areas of the specialisation, comply with the requirements set out by each specialisation and successfully pass an oral and/or written exam. There is still no specialisation in Community Pharmacy but it is being strongly considered for the near future.

Singapore established national competency standards for pharmacists in advanced practice, national pharmacy residency programme (PGY2) for specialty areas of pharmacotherapy;

and a national register for specialist pharmacists (in areas of cardiology, infectious diseases, psychiatry, oncology, geriatric care; with future expansion in paediatric care and intensive care).

Strategies for overcoming barriers to implementation

Australia has reported on the progress made in the development and implementation of a practitioner development pathway for pharmacy[e]. The Australian Advanced Pharmacy Practice Framework (APPF) was published in October 2012, and the Australian Pharmacy Council (APC) was endorsed in December 2013 as the independent entity being responsible for the credentialing of advanced practitioners in Australia. In 2014, APC began a credentialing of advanced practice pharmacists pilot programme, to evaluate the assessment processes prior to full implementation of the programme. Based on the findings of the pilot, APC began a National Credentialing of Advanced Practice Pharmacists programme in March 2016. Due to sustainability issues with the model, the credentialing programme ended in October 2016. In February 2017, the profession recognised that formalised advanced pharmacy practice was needed now more than ever for pharmacists to be able to competently manage increasingly complex patient services and demanding healthcare needs[f]. An Advanced Practice 'from pilot to permanent' Think Tank, was held amongst representatives from all key pharmacy organisations in Australia with a collective commitment to developing a central operational mechanism to advance the national pharmaceutical workforce, in turn strengthening medicines management and delivering optimal health outcomes to Australians. Work continues between organisations to develop this mechanism. In addition, progress towards transnational parity of advanced pharmacy practice has taken a significant step forward with the signing of an agreement between the RPS of Great Britain and the Society of Hospital Pharmacists of Australia (SHPA). The new agreement will see the RPS and the SHPA collaborating to deliver quality-assured education, training and development opportunities mapped to pharmacist career stages in the UK and Australia, including mutually accredited, two-year advanced practice specialist residencies for pharmacists across a range of practice areas[g].

[e] - Galbraith K, Coombes, I, Matthews A, Rowett D, Bader L, Bates I. Advanced pharmacy practice: Aligning national action with global targets. Journal of Pharmacy Practice and Research, 2017. 47(2):131-135. Available from: 10.1002/jppr.1333

[f] - The Society of Hospital Pharmacist of Australia (Media Release). From pilot to practice: Advancing Australian pharmacy workforce confirmed as priority. Melbourne: The Society of Hospital Pharmacists of Australia, 2017. Available from: www.shpa.org.au/news/from-pilot-to-practice-advancing-australian-pharmacy-workforce-confirmed-as-priority

[f] - The Society of Hospital Pharmacist of Australia (Media Release). Historic partnership heralds new international advanced pharmacy practice model. Melbourne: The Society of Hospital Pharmacists of Australia; 26 May 2017. Available from: www.shpa.org.au/news/historic-partnership-heralds-new-international-advanced-pharmacy-practice-model-o

Advanced and specialist pathways under development

In **Brazil**, the process to define the regulatory framework for qualifications of pharmacists specialised in advanced professional practices in various sectors is under development in the Federal Council of Pharmacy (professional regulatory organization), involving the establishment of educational requirements and delimitation of professional competencies. Some examples include the areas of homeopathy, anthroposophy, oncology, clinical cytology, and pharmaceutical prescription.

Malaysia is currently working on developing a system for advanced practice and specialisation. Formalising specialisation for pharmacists, as well as credentialing and privileging mechanisms for advanced practice, are being led by the Pharmaceutical Services Division of the Ministry of Health (MoH). In the meantime, the MoH, the Malaysian pharmaceutical association and the Academy of Pharmacy encourage pharmacists to obtain certification from the Board of Pharmacy Specialties (BPS). Currently, pharmacists in Malaysia can lead diseases-specific clinics; these include management of asthma, diabetes mellitus, hypertension, HIV/AIDS and specific medicines and services such as anticoagulants, methadone, smoking cessation, etc. Pharmacists need to undergo adequate training and certification as the providers of these specialised services.

Although the introduction of the new specialities has not taken place in **South Africa** yet, there are currently infrastructures in place for the existing specialities. In addition, there is an accredited programme in Primary Care Drug Therapy that can be used to obtain a permit which authorises pharmacists to initiate therapy in accordance with strict treatment guidelines for primary healthcare.

Zimbabwe's pharmaceutical council is working on developing a framework for recognition of advanced and specialist pharmacy personnel. Soon, Master's degrees in regulatory pharmacy, toxicology and traditional medicine will be offered by the University of Zimbabwe.

Argentina reports having established a National Committee for Certification and Recertification of pharmacists; while it is not directly linked to advancing practice and/or specialisation nor it is mandatory for pharmacists, it does provide a working pathway for professional recognition that could in the future provide a platform for advanced and/or specialised recognition.

Postgraduate education and training for advanced and specialist practice

In some countries, higher education is linked to development strategies for advanced and/or specialised practice. Costa Rica reported progress by describing the specialist master's degree as a pathway to advancing clinical pharmacy practice. The University of **Costa Rica** is developing a master's degree in

hospital pharmacy with an emphasis on clinical pharmacy, and the University of Medical Sciences offers a master's degree in Clinical Pharmacy too.

Similarly, **Ghana** reported that pharmacists have access to university-run fellowship programmes leading to specialisation in various areas of practice. In addition, the pharmacy council makes note of additional qualifications obtained by pharmacists in the register of pharmacists.

There is currently no formalised recognition system for advanced and/or specialist pharmacists in **Namibia**. However, it is intended that various programmes will provide stepping-stones towards specialisation in various fields. These include: intake of Masters and PhD level research training since 2013; launch of a work-based post-graduate clinical programme (Master of Pharmacy – Clinical) in 2016 for pharmacists; piloting of a pre-registration internship training support programme for graduates; development of a taught post-graduate programme in industry & regulation (Master of Pharmacy) intended to launch in 2018; and development of a taught post-graduate programme in veterinary pharmacy (PG Diploma in Veterinary Pharmacy) intended to launch in 2018/19.

Paraguay reports that recent reviews in curricula have been made to develop problem-solving, communication and leadership skills in graduates –allowing them to take on more complex roles in practice and preparing for the delivery of advanced services.

In **Zambia**'s industry-focused pharmacy profession, advanced training in pharmacy involves conducting research; developing a national strategic plan will make it easier to generate further research and outcomes that can benefit the field.

While formalised advanced and specialised competency frameworks have not been reported to be in **China**, the country's hospitals are equipped with a training system and the infrastructure to support the transition of pharmacists into advanced and specialised areas of clinical practice.

International collaborations and partnerships

Residency programmes are available for health professionals through government-led initiatives in the **United Arab Emirates**. Pharmacists have access to advanced training opportunities mainly through the network of public-private partnerships and private international healthcare facilities (e.g. pharmacy residency programmes through Cleveland Clinic, USA for the pharmacists in the Cleveland Clinic, Abu Dhabi). Pharmacists are encouraged to become certified by the US BPS, especially in Nutrition Support Pharmacy. Many Board-certified pharmacotherapy specialists are already working in hospitals. International collaboration is a key national strategy for advancement of pharmaceutical workforce.

PWDG 5: Competency development

Competency development frameworks and tools

Two tools have been developed in **Australia**: (1) the Clinical Competency Assessment Tool and (2) a new national competency standards framework. Australia developed the Clinical Competency Assessment Tool (shpaclinCAT) using CoDEG's General Level Framework (GLF) for Pharmacist Development in General Pharmacy Practice as the basis. The shpaclinCAT was the first clinical competency assessment tool described for Australian pharmacists. clinCAT was made possible through a Memorandum of Understanding between SHPA, Monash University and the UK Competency Development and Evaluation Group (CoDEG). clinCAT aims to support pharmacists' professional development in all settings through structured evaluation.

A new national competency standards framework for Australia was released in 2017[h]. The framework was developed by the Pharmacy Practitioner Development Committee (PPDC) which has representatives from all 11 pharmacy member organisations. This revision of the 2010 standards was conducted as part of a regular cycle of reviews to ensure the profession's competency standards framework is consistent with contemporary pharmacist practice and the interests of public safety, and reflects future needs of the Australian healthcare system. The new Competency Standards framework consists of five domains covering (1) Professionalism and ethics, (2) Communication and collaboration, (3) Medicines management and patient care, (4) Leadership and management and (5) Education and research. This new edition has integrated the existing Advanced Pharmacy Practice Framework (APPF) to now produce a single competency standards framework to truly reflect the continuum of practitioner development.

In **Ghana**, competency standards for all stages of professional careers including leadership development frameworks for pharmacists have been developed by the country's pharmacy Council. The council is working to ensure alignment of training curricula with these competencies.

[h] - Pharmacy Practitioner Development Committee. National competency standards framework for pharmacists in Australia 2016. Canberra; 31 May 2017. Available from: http://advancedpharmacypractice.com.au/download/resources/5202%20National%20Competency%20Standards%20Framework%20for%20Pharmacists%20in%20Australia%20_FINAL.

Great Britain's RPS developed the Foundation Pharmacy Framework (FPF) and the Advanced Pharmacy Framework (APF) (developed from evidence based development frameworks); the two frameworks underpin the Foundation Programme and Faculty, respectively. The frameworks are applicable to all sectors and settings of pharmacy practice, and align well to global competency frameworks. Leadership competencies form one of the six clusters in the APF.

Paraguay's National Agency for the Evaluation and Accreditation of Higher Education (ANEAES) established a national profile of the pharmacist, with the support of the Career Advisory Commission. The document is the result of collaborative work among a group of national experts and representative bodies.

Singapore has also developed two frameworks describing (1) national competency standards for entry-to-practice pharmacists and (2) national competency standards for advanced practice pharmacists.

Competency frameworks under development

Japan's collaborative project with Great Britain's RPS is expected to result in the productions of foundation- and advanced-level competency frameworks for pharmacists in Japan based on validated and utilized frameworks in Great Britain.

Competency development is a work-in-progress project in **Namibia**. Currently, competencies are described for all taught cadres but scopes of practice are not yet properly described.

Portugal's Pharmaceutical Society Boards of Specialisation and professional groups are in the process of developing competency frameworks for various areas of the specialisation: community pharmacy; hospital pharmacy; regulatory affairs; and pharmaceutical industry. These will undergo review by the Society's Council for Qualification and Admission (CQA). There are also areas where "recognition of training" needs to be sought to deliver certain services (e.g. administration of vaccines and injectable medicines). Other areas of "recognition of training" have been drafted, but are still pending formal approval (e.g. dispensing of antiretroviral therapy in community pharmacies).

Progress has been made in **South Africa** in their development process. The country reported that the development of the competency standards is progressing well. Competencies have been identified for all stages of professional practice.

The **United Arab Emirates** also reported that the regulatory agencies overseeing education, training and practice are keen on developing competency standards. Currently, pharmacy graduates must first pass a 'competency exam' before undergoing compulsory training of 6 months to 2 years in length in order to become licensed practitioners.

The **United States of America**, on the other hand, describes progress made towards this PWDG through the development of Entrustable Professional Activities (EPAs). The rationale for development of the first set of EPAs for pharmacy graduates was to provide clarity regarding the knowledge, skills and abilities of professionals completing entry-to-practice education at the doctoral level (PharmD). This enables strong curricular assessment and implementation, enhanced learner assessment opportunities, and provides tools to communicate to key stakeholders (e.g., patients, employers, policymakers) exactly what graduates are prepared to do.

Competency standards to guide pharmaceutical education and training

In **Costa Rica**, the professional association has established the general competencies of the Costa Rican pharmacist, the professional academic profile and the specific competencies based on the principles of Primary Health Care.

An initial competency framework for pharmacy graduates in **Malaysia** has been included in the standard for pharmacy education providers in Malaysia. In addition, the Ministry of Health's Pharmacy Services Division has developed and implemented credentialing and privileging for pharmacists who have been working in specific areas of practice; and this move towards specialisation supports the development of specialist competencies.

PWDG 6: Leadership development

Leadership development frameworks for healthcare and pharmacy

In **Singapore**, leadership development opportunities are available on the institutional and national levels. Institutions have in place leadership development programmes (such as self, team, organizational leadership programmes) offered to identified individuals for succession planning. On a national level, the Ministry of Health's (MoH) Healthcare Leadership College (HLC) offers leadership programmes for identified candidates with potential to be groomed into future leaders for the profession. The HLC supports the building of strong leadership capacity and capabilities for Singapore's national public healthcare system, in line with the MoH's vision and strategic priorities. HLC developed the S.E.E.D Competency Framework (described in more detail in section 3.4); the Framework which serves as a basis for leadership programme development. The framework describes the core leadership competencies that are required of leaders at all levels (Self, Enabling, Execution, Direction).

Great Britain's RPS developed the RPS Leadership Development Framework, which is based on the national Healthcare Leadership Model (See Part 3.4 for more information). The RPS Foundation and Advanced competency frameworks are aligned with the RPS Leadership Development Framework. This Framework provides uniform development of leadership behaviours for all pharmacists and pharmaceutical scientists, outlining leadership attributes to which all members of the profession should aspire.

Developing leadership as a competency

Australia has placed emphasis on leadership as part of their competency development frameworks. The 'Leadership and management' domain in the new national competency standards (released in May 2017) were significantly expanded from the 2010 edition and include two standards which are universally applicable to all pharmacists: (4.1) Show leadership of self and (4.2) Manage professional contribution. The standards within this domain encompass the development of leadership and management expertise throughout a pharmacist's career. For this reason, some standards will apply to early career pharmacists while others will apply only after significant career progression has occurred and the pharmacist is engaged in activities of greater complexity that impose higher levels of responsibility and accountability.

Japan is working towards developing an advanced-level competency framework for pharmacists. This framework includes competencies for leadership to support pharmacy practitioners in Japan to develop their leadership. A national policy document 'Training for leaders to lead community-based integrated care systems in their community' outlines guidance for leaders to establish the community-based integrated care systems. While this policy does not address the leadership skills directly, it does provide strategies on how leaders need to progress the development of the integrated care system.

Developing leadership in students

Costa Rica reported that, at various stages of their educational journey, students develop leadership competencies through activities targeted at instilling both clinical and executive leadership. Often, these activities form part of curricular outcomes.

Paraguay identifies pharmacists as healthcare professionals with the capacity to lead, innovate, and uphold ethical standards; pharmacists are therefore expected to integrate into multidisciplinary teams, and be committed to the health needs of society. With this ethos, pharmacists are instilled early on with leadership-relevant skills such as problem-solving during undergraduate education and training.

South Africa has incorporated leadership-development components into the undergraduate degree. At the postgraduate level, pharmacists may choose to pursue Master's in leadership or business administration.

Barriers to leadership development

Ghana reports challenges to implementation of this PWDG. Though there are guidelines and procedures governing professional leadership, they are not usually adhered to. The use of appraisal systems in guiding promotions and leadership development is also reportedly suboptimal.

Resources and initiatives for leadership development

Malaysia's professional pharmacy association and other institutions provide workshops and trainings for leadership. Active collaborative projects between two student organisations, the Malaysia Pharmacy Students Association (MyPSA) and the Young Pharmacists Chapter of MPS, are contributing to developing leadership skills in pharmacy students and young pharmacists. In addition, a promotional scheme for pharmacists working in the public sector and academia provide opportunities and incentives to climb the leadership ladder.

In the **United States of America**, the Academic Leadership Fellows Programme targets the academic workforce; it prepares 30 faculty members annually to assume new or expanded leadership positions in the academy. Almost 400 pharmacy faculty members have completed this year-long programme. The programme has demonstrated success as measured by the number of fellows that have risen to top academic leadership positions in colleges and schools of pharmacy and the retention of fellows in academia.

Argentina has reported that the current Pharmaceutical Continuing Education Programme, as well as a number of academic activities, contribute towards the leadership development of pharmacists. Pharmacists in the **United Arab Emirates** have access to some specific training programmes and CPD opportunities that target the development of leadership skills. Additionally, the National Strategy for Innovation directly calls for taking concrete steps in leadership development. There are some training programmes in China offering pharmacists opportunities to develop their leadership skills; there are also leadership programmes jointly developed and offered between some universities.

PWDG 7: Service provision and workforce education and training

Identifying pharmaceutical workforce services and practice scopes

Australia has developed a vision statement, 'Building upon pharmacists' practice in Australia: A vision for the profession'. The purpose of this vision statement is to inform members of the profession, pharmacy organisations, consumers, governments, other health professions and stakeholders of the preferred future practice of pharmacists in Australia. The statement endorses pharmacists as leading healthcare professionals in medication management and related activities, describes the focus, nature and quality of their practice and provides guidance for the advancement of their practice through integrated development of a range of key enabling domains. The document lays out a set of ten functions which pharmacists undertake in order to give effect to the vision; and eight Enablers which are key areas or domains requiring integrated development to enable pharmacists to undertake the functions.

Japan's on-going project of developing competency frameworks is intended to shape and support emerging new models of care according to health needs of Japan. The national Vision also provides the foundation of the needs-based approach to workforce development towards improved national health.

Adopting multiple strategies and programmes

Multiple strategies to support the implementation of this PWDG in **Brazil** include the organisation and government funding of: a national professional and multi-professional residency system with grants for pharmacists, involving the development of the workforce through work education, integrated with the organization of health services, and based on social needs and determinants; postgraduate courses aimed at transforming the professional practices of the pharmaceutical workforce in public healthcare, promoting education in the context of services, including the training of preceptors, educational facilitators and pharmacists; state Schools of Public Health promote training programmes and courses for pharmacists and other healthcare professionals by focusing on management, governance and clinical practices; and a public database of international and national scientific journals and evidence-based information in health is available for all registered pharmacists, allowing any pharmacist access to apply evidence-based practices. Some initiatives have sponsored and encouraged professional actions to promote the rational use of medicines. A national award and a special committee are in place to encourage events and projects that engage pharmacists, doctors, patients and other professionals. In the private sector, many initiatives have promoted pharmacists training in clinical practice, therapeutics management, pharmacy's management, and other areas.

Singapore has a number of service programmes and initiatives that demonstrate the extent of pharmaceutical workforce service delivery: (i) courses are soon to be offered on non-medical prescribing for pharmacists; (ii) the existence of team-based chronic disease management clinics (services) as part of the ambulatory residency (PGY2); and the provision of Medication Management Service (MMS) by trained pharmacists.

Integration with early education and training and advanced practice

Throughout pharmacy training in **Costa Rica**, there are several courses that address public health and specifically pharmaceutical services related to the promotion of healthy lifestyles.

Ghana's pharmacy schools are contributing to the involvement of more pharmacists in health promotion activities and practice research. Existing efforts need to be strengthened with better collaboration between training institutions and stakeholders (e.g. ministry/policy, practitioners, other health professions and society).

Recommendations outlined in the RPS Vision for the pharmaceutical workforce in **Great Britain** put patients at the centre, encouraging a needs-based, outcomes-focused approach to professional pharmacy education and training for student and pre-qualification years. It also acknowledges that pharmacists will be integral to supporting patients at all stages of a clinical care pathway involving medicines. These recommendations are aligned with the RPS Roadmap to Advanced Practice; there should be high quality of education and training required from entry onto an undergraduate programme through to post-registration development (i.e. Foundation Training to Advanced Practice), to enable pharmacists to be 'the best they can be' for their patients. Clinical Pharmacists in General Practice (GP) are directly providing services to support meeting patients demands and the UK government has committed to funding the recruitment, training and development of more clinical pharmacists.

Argentina referred to recommendations by the Pan American Health Organization and the World Health Organization (PAHO/WHO) for pharmaceutical education and training. A Pharmaceutical services course for Primary Health Care managers is also available.

In **Kenya**, both the diploma and internship programmes are built around the care-needs of the patient population served by Moi Teaching and Referral Hospital.

This is one of only two referral hospitals in Kenya and has many unique patient care challenges for the learners to address. The patient-centred care models focus on both inpatient and outpatient settings. These opportunities include adult and paediatric medicine, community health, chronic diseases, reproductive health, surgery and anticoagulation. All care programmes are managed in conjunction with the Kenyan Ministry of Health.

Malaysia reported that most of the education providers engage the stakeholders (i.e. representatives from various practice sites; hospitals, community pharmacies, industries and regulatory). This is done to ensure that education is relevant to practice. Experiential learning in hospital, community pharmacy and pharmaceutical industry is a compulsory component in all pharmacy programmes. Exchanges between academics and practitioners occur through different platforms. Some universities engage practitioners as part-time lecturers and preceptors; a small number of academics continue to practice as locum pharmacists or at university-owned pharmacies.

Namibia's strategies towards fully implementing this goal are still under development. Currently, there are two running initiatives that complement each other. The University of Namibia School of Pharmacy has created a number of part-time positions that will bridge the gap between education/training and practice. The Ministry of Health and Social Services has also created positions that focus on education, training and research.

Zambia is committed to establishing a patient-centred and integrated health services foundation for workforce development; multisectoral engagement, in the form of collaboration through research, is one approach undertaken in Zambia. Similarly, China reported that developments have been made to establish patient-centred model of care for pharmacists to provide healthcare services.

Paraguay's pharmacy students are prepared early on to deliver needed services. Students are taught to: promote the rational use of medicines in health professionals, patients and the community; provide advice on medicines for the prevention and treatment of diseases based on clinical studies and scientific evidence; integrate in multidisciplinary health teams in the administration, planning, programming, execution, evaluation of health campaigns and programmes; integrate in healthcare teams especially in Primary Healthcare; develop programmes of pharmaceutical care and provide pharmaco-therapeutic follow-ups; design, direct and carry out research related to medicines and related in public, private and/or independent care centers; and manage institutions and human resources.

South Africa's undergraduate curriculum accommodates experiential learning at various health facilities. This forms an important aspect of qualification development. The mandatory community service year also provides the opportunity to gain practical experience. At this stage, there is no universal programme for education providers to develop their capability and competency in this area.

Uganda's reported that an innovative method of training field pharmaceutical workforce in skills and behaviours needed to effectively provide supportive supervision at health units is underway. Such skills are not exclusively knowledge-based and therefore need to be modelled and practiced. The aim is to implement a training approach centred on videos to engage the workforce in practicing supportive supervised interactions and critique their own and their peers' practices.

The **United States of America** provided an example of how education strategies can drive and shape workforce service delivery at the local and national level. The Interprofessional Education Collaborative (IPEC) allowed a multiprofessional partnership in Colorado to change local law, increasing opportunities for all students. This led to the creation of an interprofessional, student run, free clinic in Aurora, Colorado. As a result of IPEC and its influence on member institutions, pharmacy and other health professions students have provided needs-based interprofessional patient care across the country. For example, at the University of Colorado, all 160 pharmacy students in each class participate in IPE introductory pharmacy practice experiences (IPPEs) and half of these students choose to further engage in IPE-based advanced pharmacy practice experiences (APPEs). Activities include drug information consults, medication reconciliation, patient disease state education, medication device education, home visits focusing on transition of care, and participating in group diabetes appointments.

Regulated practice shaping workforce service provision

Healthcare facilities in the **United Arab Emirates** revolve around patient centred and integrated care. Service enhancement and workforce education and training are common policies of these healthcare facilities. It is also mandated by the healthcare regulators in the country that delivery of patient care be enhanced and this influences both the nature of pharmaceutical service delivery and the development of pharmaceutical workforce strategies.

PWDG 8: Working with others in the healthcare team

Integrating interprofessional collaboration with education and training

Australia is conducting a review of the accreditation systems for registered health practitioners in Australia. The Australian Pharmacy Council is working as an active member of the Health Professions Accreditation Collaborative Forum to ensure that accreditation standards and processes facilitate the development of a workforce that engages in interprofessional collaborative practice. This includes the setting of interprofessional accreditation standards and cross-profession accreditation processes to ensure interprofessional education (IPE) elements are integrated into the workforce's education and training.

The **United Arab Emirates**' national Commission for Academic Accreditation mandates the inclusion of IPE and encourage collaborative practice in experiential learning. Medical schools and training facilities are shared by healthcare professionals. Pharmacy students are posted with medical students in clinical ward rounds in their internship. IPE committees are functioning in the educational institutions.

Pharmacy students in **Costa Rica** receive several courses throughout their university education in which they must interact with students from other professions with the objective of developing projects that bring together the contribution of each professional area and various perspectives.

Ghana also integrated IPE components into their education and training systems. This is exemplified by the institutionalisation of pharmacists in ward rounds with the wider healthcare team and the inclusion of nursing and laboratory orientations as mandatory courses in the current pharmacy programme. However, interprofessional training as a concept has not yet fully developed and Ghana believes that this is worth pursuing to encourage better collaboration and teamwork among health professionals.

Participants of both the diploma and internship programmes of **Kenya** work collaboratively with physicians, nursing staff and other health professionals and trainees throughout the entire programme. In addition, the diploma programme was created and approved by key stakeholders, which included pharmacists, physicians, nurses and hospital administrators.

A clear feature of undergraduate education in **Namibia**, especially the pharmacy and medical training, is that students are taught together for about half of their curricula. There are attempts that the same is achieved for postgraduate programmes (e.g. MPharm and MMed Internal Medicine).

Some universities in **Malaysia** have also initiated IPE elements in their curricula; these include National University of Malaysia (UKM), Monash University Malaysia, International Islamic University of Malaysia and University of Science Malaysia.

Paraguay is training pharmacists such that they are able to work with other healthcare professionals and manage multiprofession human resource teams appropriately.

In **Singapore**, IPE was implemented at the National University of Singapore in 2010. The programme involves students from dentistry, medicine, nursing, pharmacy and social care work; and aims to prepare these students into collaborative practice-ready health workers. Students are taught IPE core curricula and carry out IPE-enriching activities to achieve 6 competencies, namely (1) maximizing interprofessional teamwork, (2) effective communication with other healthcare providers, (3) optimising roles and responsibilities of members in an interprofessional team to achieve best outcome for patients, (4) building relationships with co-workers and patients based on shared values and ethics, (5) offering holistic care to patients, families, the community or special population groups (6) and achieving collaborative learning and reflections.

National policies, initiatives and practice programmes

Brazil reported two key strategies to be in place to support collaborative practice environments. The Multiprofessional Residency represents a strategy of collaborative work, integrating the diverse professions of health together. The Family Health Support Teams (NASF) were created in 2008 to support the consolidation of Primary Health Care in Brazil, expanding healthcare offerings in the service network, as well as the resolution, scope and target of actions. The NASF is configured by interprofessional teams that jointly carry out therapeutic projects and services. The NASF institution also collaborated to integrate pharmacists into primary healthcare workforces.

In **Great Britain**, the Foundation Programme and the Faculty both encourage teamwork and collaborations, which is clearly defined in their respective developmental frameworks.

Japan described multiple strategies and programmes that are aligned with the implementation of PWDG 8. The recommendations outlined in 'Model core curriculum for pharmaceutical education' policy document point out that pharmacy graduates are expected to gain basic team-working skills. On the other hand, the national guideline for training placements in undergraduate pharmaceutical education features collaborative working in a team-based healthcare as a requirement of each placement.

The national competency framework that is being developed will clearly set out the competencies for collaborative working, which can then form the foundation for developing interprofessional education and training. Japan's pharmacy leadership programme aimed at training leaders to lead community-based integrated care systems in their community clarifies a need of a collaborative working between all health and social care professionals and providers, which include a pharmacist as well. Finally, the Framework for training of pharmacists for the Health Support Pharmacy was developed in collaboration with other health and social care professionals to maximise the utility of pharmacists to support health of the public through community pharmacies; the Framework outlines that training should prepare pharmacists to be members of the community-based integrated, and multidisciplinary healthcare team.

Multisectoral health professional collaboration

Australia's National Translational Research Collaborative (NTRC) aims to drive high quality research that provides contemporary practice-based evidence to inform pharmacy practice and quality use of medicines. The NTRC will support junior practitioner development and enhance research capability through research mentoring/coaching/role models and inspire formal research aspirations & project involvement. A key focus of the NTRC is to ensure pharmacy research projects are up scale to work across multiple centres and across health-disciplines. In response, the Society of Hospital Pharmacists modified its research grants programme criteria to encourage funded research projects to be made up of interprofessional research groups.

In the **United States of America**, the Interprofessional Education Collaborative (IPEC) was established in 2009 by the American Association of Colleges of Pharmacy and peer organizations in Allopathic and Osteopathic Medicine, Nursing, Dentistry and Public Health. IPEC has contributed significantly to making IPE available to learners across the spectrum of health professions. Currently, a total of 20 health professions education associations are part of the IPEC Council. These associations have collectively produced core competencies for IPE, conducted more than 12 faculty development institutes serving over 300 universities and more than 1,500 faculty, and collected numerous educational resources to facilitate introduction and expansion of IPE at member institutions.

The Pharmaceutical Society of **Zimbabwe** hosts an annual joint congress with the College of Primary Care Physicians. Also, the two national organisations have occasionally combined continuing professional education sessions.

Malaysia also reported that most of the continuing professional development (CPD) opportunities are co-organized by the medical and pharmaceutical associations targeting the members of both professions.

Facilitating interprofessional collaboration through practice

Collaborations between health professionals, especially among pharmacists, medical doctors, nurses and dietitians in **Malaysia** have been developed in most of the public hospitals and clinics. In most of the hospital wards, there will be a pharmacist who reviews medication use while working in multidisciplinary rounds. Pharmacists are also routinely involved in various interprofessional committees (e.g. drug and therapeutic committee, antibiotic stewardship, emergency and disaster management, etc.).

In **Zambia**, health professionals co-exist in practice and pharmacists often find themselves involved in integrated service delivery. Clearly, there is room for development in many nations. For example, China reported limited but existing communications between pharmacists and other healthcare professionals.

Interprofessional collaboration in **Portugal** mostly takes place in hospital practice as the proximity between professionals has proved to be timely and advantageous in that setting. However, there is much variability as no regulations on hospital practice exist and they are arranged by the management of each hospital and depend on the availability of health professionals for these activities. Protocols of collaboration in specific areas are being piloted between general practitioners and community pharmacists to address non-complicated clinical conditions that will ease the burden on primary care services. Education and training on collaborative approaches to healthcare will be considered to support further activities within this scope. Student associations are lobbying for more collaborative learning elements. The Education & Practice Platform will also try to provide guidance on postgraduate training to involve several healthcare professionals as lecturers.

Developing strategies for collaborative working for better health

South Africa identified the development of interprofessional collaboration as a critical element, particularly as the country prepares for introduction of universal health coverage and there is currently no national programme available.

PWDG 9: Continuing professional development strategies

According to the revised Pharmacy Board of **Australia** CPD Registration Standard, pharmacists in Australia are required to plan their CPD on an annual basis in order to renew their annual registration. Pharmacists must: (1) reflect on their scope of practice, and any proposed changes to their practice, against the current National Competency Standards Framework for Pharmacists in Australia and identify relevant competencies; (2) identify professional development needs relevant to these identified competencies; and (3) identify suitable CPD activities which address these professional development needs.

Costa Rica's professional association has developed a functional Pharmaceutical Professional Recertification System since 2002. Currently, more than 750 members participate in it. The College promotes continuous pharmaceutical education through activities carried out both at its headquarters and in its subsidiaries. In addition, online pharmacy refresher courses are promoted in topics related to Primary Health Care, Pharmaceutical Care, Pharmacy Legislation and Ethics, among others, as well as in all aspects related to new legislation such as: Pharmacovigilance, Braille Medication Labeling, and Registration Sanitary of Medications. A biannual National Pharmaceutical Congress is intended, among many aims, to encourage continuous professional development. Additionally, the Faculty of Pharmacy of the University of Medical Sciences, through the Center for the Development of Pharmaceutical Initiatives (CEDIFAR), provides continuous education solutions to national and international professionals. In-person and on-line courses, synchronous and asynchronous, have been offered.

The CPD policy for pharmacists in **Ghana** provides a platform for self-directed learning. Practitioners can run their CPD programmes based on their practice/career needs and initiatives. The implementation of a mandatory minimum CPD credit points system sustains the career development pathways. In-line with new thinking of being socially responsive, targeted new programmes are to be developed to complement current programmes.

The professional regulator in **Great Britain**, the General Pharmaceutical Council, set out the standards for CPD requirements. All pharmacists and pharmacy technicians are required to comply or their registration may be put at risk. CPD entries must be structured according to the cycle of reflection, planning, action and evaluation. Strategies and vision statement put forward by the RPS support the need for pharmacists to demonstrate their skills, knowledge, and practice using RPS standards and professional development frameworks in all care settings and for the ultimate benefit for patients. RPS Professional Development Programmes support CPD and meet regulatory requirements for continuing fitness to practise. The RPS Foundational and Advanced Frameworks also contain competencies for CPD and lifelong learning.

Described earlier under PWDG 2, **Japan** has in place a quality assurance mechanism for lifelong learning programme; this national mechanism provides evaluation criteria to maintain the quality of pharmaceutical education in Japan. The joint project between leadership bodies in Japan and Great Britain will develop competency frameworks that will include CPD competencies. A national Vision statement describes the current and future roles of pharmacists in the team-based healthcare, from initial education to lifelong learning.

All practicing pharmacists in **Malaysia** need to collect a minimum of 30 CPD points for the renewal of annual retention certificate. A list of criteria have been developed by the Malaysian pharmaceutical association and the Ministry of Health (MoH). Members of the association are able to record their CPD points online. In addition to the association, CPD providers include universities, pharmaceutical industries, chain pharmacies, hospitals, the MoH, and scientific journals.

In **Namibia**, all postgraduate programmes that serve as mechanisms for CPD/CE are needs-based programmes. CPD strategies in **Paraguay** are reportedly aligned to the strategies proposed in the National Health Policy. Similarly, **China** reported that pharmacy professional development activities are linked with some needs-based health policy initiatives and pharmaceutical career development pathways.

Portugal's Pharmaceutical Society oversees a CPD credit system that awards pharmacists' educational and professional activities with a numeric value. Credits attributed consider hours of a number of activities including: learning, practice, publication, tutoring/mentoring pre-registration students and patient monitoring, to name a few.

Mandatory CPD was implemented in 2006 in **Singapore**. The public sector offers a Ministry of Health Pharmacist Career Track for public patient care centred institutions.

There is no national CPD strategy in **South Africa**; but the introduction of the new competency standards in South Africa will drive the development of a CPD system, especially when the standards will be incorporated into the current on-line recording system. Similarly, having a future national CPD strategic plan is needed in **Zambia**.

Pharmacists in the **United Arab Emirates** are required to complete 20 credit hours gained through accredited CPD events every year for the annual renewal of their registration.

PWDG 10: Pharmaceutical workforce gender and diversity balances

Diversity in the student body and academic workforce

Brazil's "affirmative policies" aim to ensure opportunities for ethnic minorities. In public universities, there is a special admission process. In public institutions, there are job vacancies for ethnic minorities and people with disabilities. No policies are in place to ensure gender diversity in pharmaceutical workforce in either the public or private sectors, but the rate of woman is high in all sectors except in political positions where the rate of women is lower.

In the **United States of America**, the Task Force on Diversifying Our Human Capital examined strategies that have worked in pharmacy education and other disciplines to insure a diverse student body and practitioner population that mirrors the diversity of the communities pharmacists serve. The Task Force report includes diversity statements for the academic community and for American Association of Colleges of Pharmacy and 4 recommendations to advance the Association's work in achieving diversity goals.

All universities in **Costa Rica** are bound by a Resolution that targets strengthening the conditions of respect for those who work and study in the institution. The policy prevents, discourages, and punishes acts of discrimination on the basis of sexual orientation and/or gender identity. The University of Medical Sciences is developing a research project to address the issue of diversity and gender with students in their immediate environment and beyond.

Ghana reported that gender parity has been attained with females comprising 49% of the student cohort. However, ensuring geographical equity in the admission process remains a challenge; students from less endowed schools are grossly under-represented. There is a policy to address this but the extent to which it is implemented has not been monitored. There are no gender restrictions on recruitments, promotions, career progression opportunities and leadership of the academic workforce. Women occupy a number of key executive positions across the country. Diversity in terms of race is not applicable but issues relating to representation of the under-privileged have to be addressed and monitored.

According to laws in **Namibia**, affirmative action is in place to reduce inequalities at the level of employment. About 70% of the student cohort in pharmacy education is female, showing no female gender discrimination within the admissions process; however, more work needs to be done on having better in-country regional representation in the student cohort.

PWDG 11: Workforce impact and effect on health improvement

Conducting research to measure impact on health outcomes

Although there is no institutionalized national programme to evaluate the impact of the pharmaceutical workforce in **Brazil**, some research projects have evaluated the impact and results of pharmaceutical services positively impacting clinical outcomes in diabetes, for example.[i]

Portugal reported a study conducted in response to a request by the Portuguese Pharmaceutical Society which estimates the value of the pharmacists' interventions on health outcomes[j]. The study found that community pharmacists' interventions provide a gain in quality of life of 8.3% and an economic value of 879.6 million Euros in Portugal.

South Africa has just completed the first phase of the introduction of universal health coverage. During this phase, a number of districts were chosen as pilot sites. The potential impact on health systems and health improvement were evaluated at some of the pilot sites. These evaluations are expected to inform future research to be conducted by the national, provincial and local authorities. Research that has already been conducted includes: assessment of the impact of pharmacy assistants support to primary healthcare clinics in terms of pharmaceutical management, budget control and loss control; development of an appropriate rural model to allow pharmacy assistants to up-skill to pharmacist technicians without disruption to services; and assessment of

[i] - Determination of the effectiveness of Pharmaceutical Care in diabetic patients attended at a Popular Pharmacy in Brazil (Professor Mauro Silveira de Castro) http://buscatextual.cnpq.br/buscatextual/visualizacv.do?id=K4773513D2#ProjetosPesquisa
Evaluation of the economic impact of Pharmaceutical Care in patients with DM2 (Professor Leonardo Regis Pereira) http://buscatextual.cnpq.br/buscatextual/visualizacv.do?id=K4769296A6#ProjetosPesquisa

[j] - Available at https://www.ispor.org/ScientificPresentationsDatabase/Presentation/69183

the role and impact of pharmacists and pharmacy assistants in integrated management of chronic conditions.

Costa Rica promotes the dissemination of successful projects through poster presentations at national and international congresses. Collaborations between pharmacists and researchers in **China** are contiburitng towards evaluating impact of pharmacists on healthcare systems.

Access to essential medicines and emergency relief

In **Ghana**, there are over 15,000 pharmaceutical facilities distributed countrywide from which essential medicines are accessed. Some pharmacists were part of the emergency Ebola response team constituted in collaboration with the United Nations during the recent Ebola crisis. Current evidence on impact in Ghana is anecdotal; evidence on the impact of these activities on health is yet to be generated.

A widespread network of community and institutional pharmacies provide easy access to medicines and related products in the **United Arab Emirates**. Pharmacists provide the services to decrease medication errors, prevent and manage drug related problems and participate in public health projects.

Policies and frameworks to facilitate impact-measurement

Japan's future competency framework, which is currently under development, will allow for the measurement of the performances of pharmacy practitioners, which can in turn be used to provide evidence of the impact of workforce by analyzing with the other data in health systems. A national-level framework set out to establish integrated care systems in the community in which pharmacists are primary health service providers; and these care systems are designed to meet the needs of the communities they serve based on need assessments.

The Pharmaceutical Services Division of **Malaysia**'s Ministry of Health compiles evidence of impact of pharmaceutical services regularly. The results can be viewed by the public in its official website[k]. Additionally, academics and practitioners conduct and publish studies on impact of pharmacists and pharmaceutical services.

Similarly, **Paraguay** reported that the Ministry of Public Health and Social Welfare does keep records. Also, it is considered that workforce intelligence also provides a measure of impact; Paraguay's Register of Professions lists more than 3500 registered pharmacists.

[k] - http://www.pharmacy.gov.my/v2/en/statistik

Zimbabwe's Human Resources for Health Information System (ZHRIS) is another example of using workforce intelligence databases as a basis for measuring access to services and impact. The project is a national one and will incorporate the pharmaceutical workforce once it is fully fledged.

Establishing the National Pharmacy Strategy in **Singapore** provided an opportunity to critically review the impact of the services provided by pharmacists in the local health eco-system. This exercise gathered essential feedback and evidence for the value of the pharmaceutical workforce and how this value can be further enhanced to meet the needs of the local health system and the health service users. With the aging population and more prevalence of needs for maintaining good mental health, pharmacists are also beginning to play more active roles in these areas. Future development will include pharmacists becoming non-medical prescribers, working in collaboration with doctors to optimise treatment for patients. In addition, pharmacists are also becoming more involved in regulatory affairs and pharmacovigilance; ensuring people in Singapore have access to quality health products.

Scaling up the workforce to maximise impact

A national workforce survey is currently underway in **Namibia** to measure the exact impact of education on the workforce; however, no work is being done to measure the impact of workforce on health systems and improvement. It is assumed by Namibia that having increased the workforce by about 15% in the last 3 years will have had a measureable impact.

PWDG 12: Workforce intelligence

Workforce intelligence strategies under development

Australia's Pharmacy Leaders Forum (APLF) advocates for government investment in modelling and pharmacist workforce planning. The APLF is an independent coalition of senior decision-makers from national pharmacy organisations who work together on issues of national importance to the pharmacy profession and the public. Pharmacy is the fourth largest registered healthcare profession in Australia, and forward planning to ensure the pharmaceutical workforce can meet the ever-changing needs of patients and the future health system, is crucial. The pharmacy profession currently has no ability to predict with any degree of accuracy, the balance between supply and demand for pharmacists and what the balance should or will be at any given time in the future. Existing 'Australia's Future Health Workforce' (AFHW) reports contain detailed modelling on workforce supply,

demand and training, for doctors, nurses and oral health, and projects numbers required of these workforces up to 2030. There are no such AFHW reports for pharmacists. The APLF continues to work with government to implement a longitudinal study of the pharmacist workforce. This would enable development of an Australian pharmaceutical workforce strategy and ensure the nation maintains the right pharmacist workforce capacity and capability.

The Pharmaceutical Council in **Ghana** is in collaboration with the Ministry of Health (MoH) in leading a national strategy to collate, manage and share workforce data and planning activities.

Currently a national workforce survey is being undertaken in **Namibia**; this will be complemented by separate surveys of graduates and students. The data will be shared with major stakeholders (Ministry of Health; Health Professions Councils; Pharmaceutical Society; National Planning Commission) to coordinate properly and plan for the future workforce.

Improving workforce intelligence on pharmaceutical scientists

Although evidence does exist on the National Health Service pharmaceutical workforce in **Great Britain**, comparable information on pharmaceutical scientists is lacking– a shortcoming that needs to be addressed. The RPS's New Medicines, Better Medicines, Better Use of Medicines guide stipulates that research and information to support workforce planning is vital in making a case for resources.

National workforce intelligence strategies and programmes

Japan's healthcare professional workforce observatory provides national workforce data and trends of workforce development. The collected data are used to consider the future workforce planning.

Malaysia's national workforce intelligence strategy is coordinated by the Pharmaceutical Services Division of the Ministry of Health, particularly the Pharmacy Policy, Strategic Planning Division and Pharmacy Practice and Development Division and the Pharmacy Board of Malaysia. Workforce issues are also being looked after by the pharmaceutical association and the Council of the Deans.

The National Parliament of **Portugal** issued a bill giving the Central Administration of the Health System (ACCS) the responsibility of collecting data for the National Inventory of Health Professionals, including the public, private and social sectors. This individual register, still under construction, will allow the completion of the current exhaustive individual database on the public sector, adding individual and reliable data on the private and social sectors.

The **Singapore** Pharmacy Council conducts a workforce survey once every 10 years. The last survey was held in 2007/08. Currently, a workforce survey 2017 is underway.

The **United Arab Emirates** collects intelligence on pharmacy students and the academic workforce through the Centre For Higher Education Data and Statistics, an agency that collects and analyses statistics from all higher education institutions.

The National Health and Family Planning Commission in **China** publishes annual reports of the workforce and their distribution across different practice settings.

PWDG 13: Workforce policy formation

Focus on the pharmacy support workforce

The 'Redesign Project' was commissioned by the Society of Hospital Pharmacists of **Australia** (SHPA) in 2016. Its aim was to review current roles of hospital pharmacy technicians/assistants, identify variations in scope of practice, and barriers to change. The project included a literature review; a review of supporting frameworks; and additional primary research including a national survey, three focus groups, six structured interviews with key stakeholders, and four case studies of innovative practice. The study found that pharmacy technicians have a limited career structure and the lack of opportunities to advance practice stifle development. Training and education quality, consistency and availability, needs to be improved. SHPA is now working towards updating current standards and workforce definitions and developing an Australian pharmacy technician/assistant competency standards framework and exploring SHPA's role in credentialing individuals for defined competency areas from entry level to advanced level.[1]

Priorities for workforce policy formation

Ghana employed strategies that are mainly centred around the following milestones: minimum entry requirement into pharmacy programmes; mandatory pre-registration training for all undergraduate students; professional examinations; and mandatory post-registration training and CPDs based on regular practitioner needs assessment and emerging health needs.

[1] - For more information about Redesign Project, see: https://www.shpa.org.au/pharmacy-technician-assistant-training-0

Policies that are currently being formed in **Japan** include the collaborative programme between the Japanese Pharmacists Association and the RPS of Great Britain. The research project will develop competency frameworks for pharmacists in Japan based on validated and utilized framework in Great Britain in collaboration with the RPS. A national vision statement for pharmacy describes the current and future roles of pharmacists in the team-based health are; the national vision was developed considering the needs in health systems in Japan.

The **South Africa** pharmacy council undertook research towards this PWDG. Their Human Resources for Pharmacy document outlines the recommendations for strategies that are needed to develop the required workforce.

Multisectoral workforce development

In **Malaysia**, the development of pharmaceutical workforce from initial education and training through advanced practice is being looked after by a number of stakeholders working with the national pharmaceutical association and these include the Pharmacy Practice and Development Division within the Ministry of Health, Pharmacy Board of Malaysia, Malaysian Qualification Agency, Council of the Deans, and other relevant associations.

In **Paraguay**, the pharmacy profession engages with employers to identify the workforce profile required by them.

Workforce development in **Namibia** focuses on scaling up the pharmaceutical workforce through in-country education and training. The future strategies for the development of pharmaceutical cadres will focus on the up-skilling of pharmacy assistants to technicians and of pharmacists to Masters holders. The latter is intended to lead to the development of specialisations from Masters-level graduates.

A surveillance of the pharmacy landscape in **Singapore** has been conducted since 2014. Stakeholders from all pharmaceutical and healthcare sectors were invited to participate in feedback and strategic planning sessions. This approach is taken to ensure that future development of the profession and its workforce will be needs-based. The data from these activities were crystallised into a 14-items National Pharmacy Strategy which was approved by the Ministry of Health in 2016.

Focus on quality assurance in education

The **United Arab Emirates** workforce development is carried out through the accreditation of pharmacy education, continuous professional development, and through accrediting institutional healthcare facilities. This is a combined effort by different strategies by Ministry of Education and pharmacy regulatory agencies. An international partnership with the Accreditation Council for Pharmacy Education (ACPE), USA is intended to facilitate to accreditation/certification visits to pharmacy educational institutions in the UAE.

2.3.3 Priorities for forward planning

The case study authors were asked to identify the PWDGs which are priority areas for development and/or evaluation in their nations over the next five years. The following Table 2.2 summarises the results.

Most countries are prioritizing a significant number of the PWDGs, with many of the countries listing all of the PWDGs as priority areas for improvement. However, some of the PWDGs appear to be of lower priority in a high proportion of countries. Such as, PWDG 10 (pharmaceutical workforce gender and diversity balances) which is only prioritized in four countries. Interestingly, PWDG 10 has the lowest number of countries mapped against it; indicating that many countries are not meeting this goal but are also not prioritizing it for development or evaluation.

Table 2.2: National five-year priority PWDG areas for development and/or evaluation.

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Academic capacity	Foundation training and early career development	Quality assurance	Advanced and specialist expert development	Competency development	Leadership development	Service provision and workforce education and training	Working with others in the healthcare team	Continuing professional development strategies	Pharmaceutical workforce gender and diversity balances	Workforce impact and effect on health improvement	Workforce intelligence	Workforce policy formation
Argentina	X		X	X	X	X	X	X	X		X	X	X
Australia		X	X	X	X	X	X	X	X		X	X	X
Brazil			X		X								X
Chile			X		X	X	X	X	X		X		
China	X	X	X	X	X	X	X	X	X	X	X	X	X
Costa Rica	X	X	X	X	X	X	X	X	X	X			
Ghana	X	X	X	X	X	X	X	X	X	X	X	X	X
Great Britain		X		X			X		X				
Japan				X	X			X	X		X		
Kenya		X		X	X						X		
Malaysia	X		X	X	X	X		X	X				
Namibia	X	X	X	X	X		X	X	X			X	
Paraguay	X		X		X	X	X	X	X				
Portugal			X	X	X				X			X	
Singapore					X	X	X				X		
South Africa			X	X	X		X	X	X				
Uganda	X		X		X				X		X		
UAE	X		X	X	X		X				X		X
USA	X	X	X	X	X	X	X	X	X	X	X	X	X
Zambia	X		X		X			X				X	X
Zimbabwe	X		X	X		X	X		X			X	X

PART 3

STRATEGIES FOR ADVANCING THE GLOBAL PHARMACEUTICAL WORKFORCE AGENDA

3.1 Evaluation and impact for global workforce development

Author: Darrin Baines, Professor of Health Economics, Bournemouth University, United Kingdom (dbaines@bournemouth.ac.uk).

Driven by:

PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
11. Workforce impact and effect on health improvement	Evidence of the impact of the pharmaceutical workforce within health systems and health improvement.	• Engagement with systems to measure the impact of the pharmaceutical workforce on health improvement and healthcare outcomes. Links with needs-based education, training and workforce planning. • Gather continuous data points to monitor the performance of the pharmaceutical workforce. • Ideally, this should be linked with strategies to enhance workforce intelligence.

Summary

a. Continual research, development and evaluation is essential to the on-going success of the global pharmaceutical workforce and the health systems it serves.

b. Evaluation of the value of health service outcomes is essential to measuring workforce Impact, one of the Pharmaceutical Workforce Development Goals (PWDG 11).

c. Existing frameworks for evaluation can be applied in pharmacy as tools to assess the impact of the pharmaceutical workforce.

d. The 'Logic model' and the World's Health Organization 'Monitoring and Evaluation Framework' can be combined in a model for evaluating the effectiveness of pharmaceutical services in any practice setting.

e. Careful planning of evaluation studies is critical for the successful tracking of workforce impact on service delivery and improved patient and population outcomes.

Background

The development of a high-quality workforce is essential to the strengthening of health systems worldwide[1]. Investing in health workers by scaling up their education and training is linked to expanded access to health care services and improved health outcomes[2]. Recently, global strategies and initiatives by bodies such the WHO, the United Nations and the World Bank have provided unprecedented support for policy-makers and stakeholders aiming to transform education and training internationally. Appropriately skilled health workers not only improve patient and population health, but a transformed workforce can also impact on employment and the economy. The purpose of up-scaling the knowledge, skills and abilities of the international pharmaceutical workforce is to help strengthen health systems worldwide.

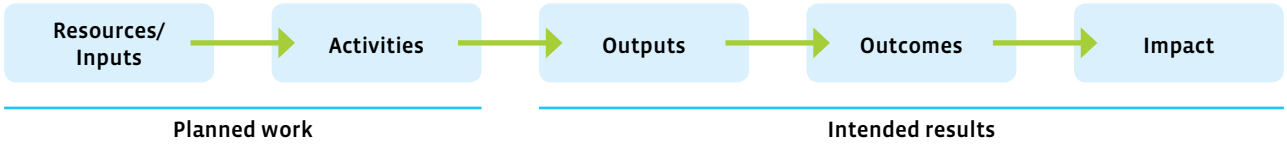
Making health systems stronger requires a continual process of change, which begins with on-going improvements in professional education and training. As a health care profession that provides evidence-based care related to medicines use, high-quality pharmacy education is often underpinned by the outcomes of robust research. Scientific studies on best practice in healthcare guide the advancement of current knowledge and techniques provided through education and training, which in turn promotes innovative practice. Research and development (R&D) is, therefore, a vital component of world-class pharmacy education and training.

To promote health systems strengthening, R&D must create changes in professional knowledge, skills and abilities that improve health and well-being at both patient and population levels. For decision-makers, understanding what works (and what doesn't) is vital to the continual process of generating beneficial change. On the ground, health systems require constant monitoring and observation that chart progress and quality over time. Assessments of the value of the outcomes produced by individual systems are also required. In sum, continual research, development and evaluation is essential to the on-going success of the global pharmaceutical workforce and the health systems it serves.

Logic models: applications in pharmacy

Whilst the concept of R&D is well-understood and regularly used in pharmaceutical research, the importance of evaluating the role of pharmacists in health systems strengthening is currently less recognised. The FIP roadmap for the pharmaceutical workforce, which is aligned to global health workforce strategies, has promoted a better understanding of the necessity of continual workforce development as a means of improving patient and population outcomes. Future work by FIP is ought to support the profession in generating reliable evidence about the effectiveness, efficiency and impact of innovations in pharmacy practice. Producing such evidence is vital because health systems require a constant flow of information that enables decision-makers to choose which programs to fund. This is especially important for the implementation of Pharmaceutical Workforce Development Goal 11: 'Workforce impact and effect on health improvement'. The "logic model" is a tool developed by the W.K. Kellogg Foundation to facilitate effective program planning, implementation and evaluation[3]. According to the Foundation, their framework is a systematic way of presenting and sharing understanding about key relationships between program resources, activities and results. Figure 3.1 outlines the basic Kellogg model, with five main stages in project operation and delivery. The Foundation recommends that their conceptual diagram is accompanied by program narratives describing the sequence of activities that will bring about change and how these activities will create expected results. Using the diagram and associated narratives, the logic approach can be used to plan evaluations of new pharmacy interventions implemented in a health systems setting. Although there are different ways to assess change, the Kellogg's framework allows competing methods to be sense-checked by stakeholders before formal evaluations begin. This ensures that the chosen approach to analysis properly captures the types of data required to fully assess the value of new programs. For this reason, logic modelling should be at the heart of pharmacy RDE.

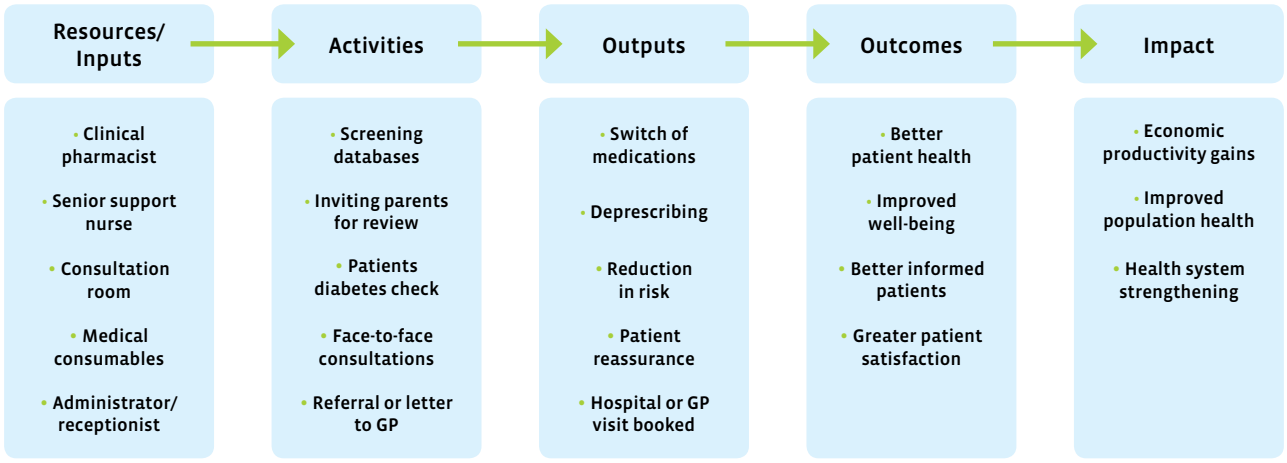
Figure 3.1: The basic logic model.



Using an example from pharmacy practice, Figure 3.2 shows how a logic model may be constructed in the context of health systems strengthening. Using medicines review clinics for diabetes as an example, the visual representation of the logic model is designed to illustrate program strengths and weaknesses and to help stakeholders examine different project scenarios. Logic models should make apparent the assumptions that stakeholders hold about how and why their programs will solve problems, generate new possibilities and make the most of scarce resources. Reading from left to right, the first stage in the example is the identification of resources and program inputs. This stage lists the following inputs into the planned diabetes clinics: clinical pharmacist; support nurse; consultation room; consumables; administrator/ receptionist. If these resources are used appropriately, then the following activities may be performed: database screening; sending of invitations; health checks; consultations; referrals and General Practitioner (GP) letters.

Together, these two stages describe the planned program of work. Next, the logical model consists of three stages that describe intended outputs, outcomes and impacts. In relation to outputs, the diabetes clinics are planned to deliver: medication switches; de-prescribing; risk reductions; patient reassurance; hospital and GP visits. If these outputs are produced, the following outcomes will be secured: improved patient satisfaction; reduced risk; more informed patients; better health; fewer emergencies. As well as generating direct benefits for patients, the diabetes clinics will have an impact on the wider community in terms of: economic productivity gains, improved population health and strengthened health system. As this simple example illustrates, logic models may be used to specify the resources, activities, outputs, outcomes and impacts that should be captured in pharmacy practice evaluations performed in a health systems context. The model can be applied across all sectors and practice settings.

Figure 3.2: Logic model for hypothetical drug review clinics for diabetes.



WHO framework for monitoring and evaluating health systems

The logic model is used worldwide to plan programs for health systems strengthening. The approach requires the identification and collection of appropriate data in each of the five stages. In 2009, the WHO presented a framework for monitoring and evaluating health systems strengthening at both country and global levels[4]. The Kellogg and WHO frameworks both picture the process of change in terms of key stages, with the latter describing the "results chain" in terms of inputs and processes, outputs, outcomes and impact. As a means of consolidating the two approaches, Figure 3.3 is a modification of the WHO monitoring and evaluation framework that better describes the ways in which pharmacy practice may be assessed in the context of health systems strengthening. Like the logic model and the WHO approach, the proposed model is built around key stages. First, resources in terms of capital, workforce and consumables are used to provide planned activities. Next, outputs are created through work processes embodied in: pharmacy practice infrastructure; technologies that enable pharmacy provision; medicines supply systems; pharmaceutical care; information systems. These processes can create a range of outputs, including improved access to medicines, database screening, medicines reviews, provision of patient services, public health activities, reductions in risks, patient education, reduced side-effects and fewer emergencies. In turn, the outputs produce outcomes that can be measured in terms of patient health status, changes in well-being and levels of patient knowledge. As well as these patient-specific benefits, pharmacy practice outputs can generate societal impact in terms of economic productivity, population health and health systems strengthening.

Collection, analysis and communication

Central to the WHO model is a focus on the importance of data collection, analysis and communication in health systems monitoring and evaluation. Data is collected from a range of sources, which often differ between the stages being sampled. These include: provider estimates, patient questionnaires, patient and population surveys, clinical reporting systems and official government statistics. As service provision and data collection are regulated in most countries, the model shows that pharmacy practice, monitoring and evaluation usually occurs within an institutional framework. An "institution" may be defined as the "law, regulations, policy, rules, conventions, ethics and norms governing behaviour". In most countries, the institutions governing pharmacy practice, data collection and health systems are clearly defined in national law and professional codes of conduct. Next, Figure 3.3 shows that data analysis may take three main forms: evidence synthesis, statistical analysis and qualitative studies. Descriptions of these approaches are provided in the accompanying boxes. Finally, the diagram illustrates that collected information may be used for national and global monitoring and reporting. When pursuing the 13 Pharmaceutical Workforce Development Goals, country-specific and international communications will be vital in demonstrating pharmacy's contribution to health systems strengthening.

Evaluation methods

Although Figure 3.3 displays the structure of data collection, analysis and communication in the proposed model, the framework does not specify which forms of evaluation should be employed. As Figure 3.4 shows, there are different ways to evaluate health system interventions, often related to specific disciplines of analysis. (The disciplines are shown in brackets in the following text). First, there are study types that include resource-use in their analysis. These include costing studies (financial), economic evaluations (economic), productivity measurement (economic) and workforce studies (labour). Combining workforce, productivity and output data are human factors studies (ergonomics). Next, impact case studies (funder) and benchmarking (management) are concerned with the consequences of producing planned outputs. Finally, outcomes research (public health) focuses on population health. Whilst these short descriptions do not convey the complexities of these different modes of evaluation, it can be concluded that: (i) there are alternative ways of evaluating pharmacy practice in a health systems context, (ii) no single approach covers the whole picture, and (iii) there many ways that the pharmacy profession can assess its success at delivering beneficial change. These conclusions suggest that the proposed framework outlined in Figure 2.3 may help evaluators decide the study types that best suit the aims of their work.

Figure 3.3: Proposed framework for monitoring and evaluating health systems strengthening.

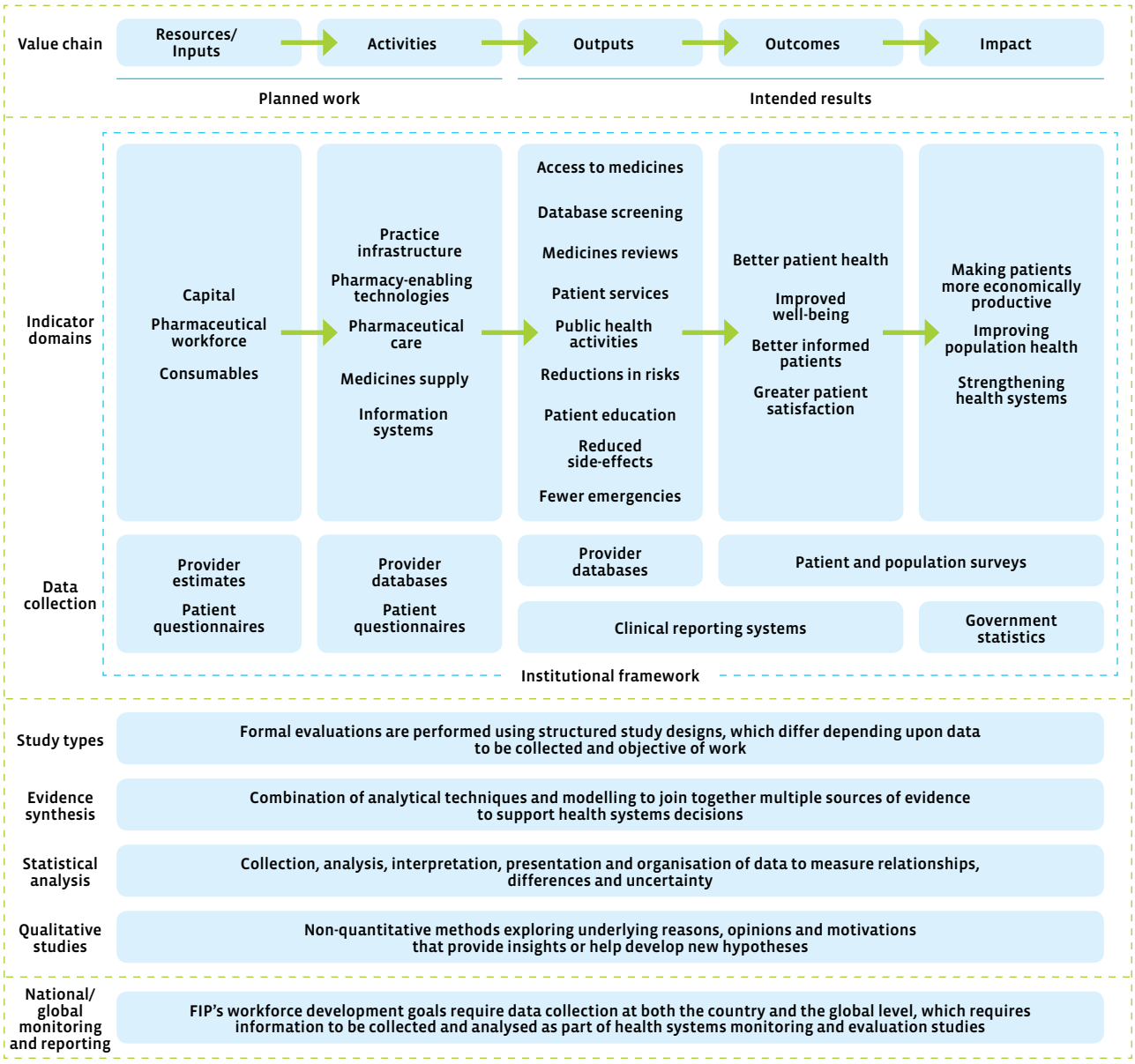
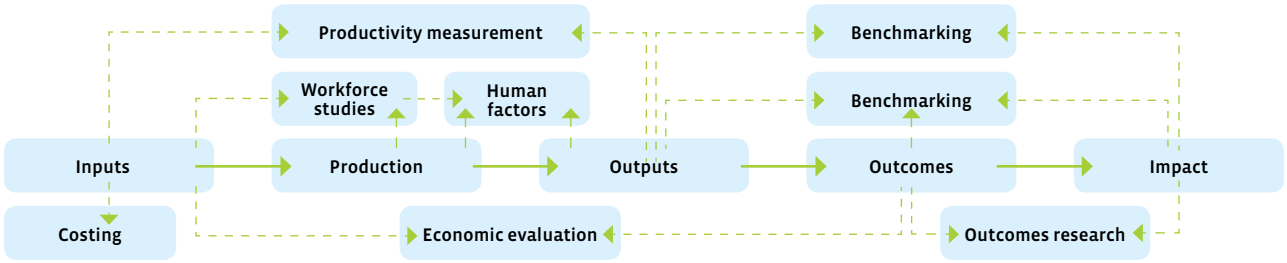


Figure 3.4: Study types that may be used to evaluate health systems strengthening.



Conclusions

The logic model is clearly established as a tool for facilitating effective program planning, implementation and evaluation. The WHO framework for monitoring and evaluation operationalises the logic model approach in a health systems context. The hybrid model presented here builds upon the strengths of the both frameworks by better describing the ways in which pharmacy practice may be evaluated in the context of health systems strengthening. This model can be used by evaluators of the ways in which the pharmacy workforce can help strengthen the delivery of health systems, particularly when the knowledge about the relationships between activities and results are required. Given the importance of measuring the results produced by pharmacists pursuing the global workforce development goals, the careful planning of evaluation studies is vital.

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3.2 From workforce intelligence to workforce development

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Driven by:

PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
12. Workforce intelligence	A national strategy and corresponding actions to collate and share workforce data and workforce planning activities (skill mixes, advanced and specialist practice, capacity). Without workforce intelligence data there can be no strategic workforce development.	• FIP should aim to have a global workforce compendium of case studies developed by 2019. • Develop monitoring systems to identify workforce trends to enable decision making on deployment and supply of pharmaceutical workforce noting that time-lags are often present in these activities. • Ideally, this should be linked with stewardship and leadership for professional leadership bodies.

Summary

a. The World Health Organization (WHO) stated that there is 'no health without a workforce'.[1] However, it is also true that there is no health workforce without workforce intelligence.

b. Workforce intelligence is one of the International Pharmaceutical Federation's (FIP) Pharmaceutical Workforce Development Goals (PWDG 12).

c. Workforce intelligence provides strategic workforce information to support workforce planning and expanding access to healthcare delivery.

d. It is important to illustrate trends in the pharmaceutical workforce to understand if the supply of pharmacists, pharmacy technicians and pharmacy support workers is keeping pace with population growth and disease burden.[2]

e. The global pharmaceutical workforce will continue to be monitored and assessed in order to shape workforce development and capacity, thereby realising the Pharmaceutical Workforce Development Goals.[3]

The global drivers

Meeting the pharmaceutical care needs of patients can only be achieved if a flexible and adaptable pharmaceutical workforce is deployed appropriately to apply its knowledge, skills, attitudes, behaviours and abilities to the maximum as part of the multi-disciplinary team.[1] The World Health Organization (WHO) stated that there is 'no health without a workforce'.[3] However, it is also true that there is no health workforce without workforce intelligence since effective deployment relies on the understanding of the state of the workforce in each nation: its quality, accessibility, acceptability and availability.[1]

The Global Vision for Education and Workforce[4] acknowledged the worldwide variability in the education, training and utilisation of pharmacists, pharmaceutical scientists and pharmacy support staff. The Global Vision is underpinned by its 13 Pharmaceutical Workforce Development Goals (PWDGs) including one on workforce intelligence (PWDG 12) which says that without workforce intelligence there can be no strategic workforce intelligence.[5] Workforce intelligence provides strategic workforce information to support workforce planning. It may also be used for assessing the performance of the workforce i.e. the impact on patient care. Workforce plans built on workforce data from local, regional and national perspectives may also ensure that the pharmaceutical workforce is effectively integrated to the health workforce to meet the health needs of patients and public.[2] This requires

workforce intelligence systems and workforce planning models. The FIP workforce development goal of workforce intelligence therefore links closely to other goals such as PWDG 13: Workforce Policy Formation (i.e. strategies to implement needs-based workforce development) and PWDG 11: Workforce Impact (evidence of the impact of the workforce on patient outcomes).[3]

The WHO, in its vision to accelerate progress towards universal health coverage, has also described an objective of strengthening data on human resources for health.[6] This links to other objectives focused on policy development and investment in human resources for health aligned with population health needs. Milestones include nations having in place workforce registries and processes for sharing data[4]. Other WHO guidelines recommend governance and planning including national plans to produce and retain graduates in the health workforce informed by needs and intelligence in the labour market.[7]

Of course workforce intelligence is not an end in itself – there is little value in collating workforce data if the data is of no value i.e. does not influence decisions on policy and planning. In a similar way, only data that effectively assesses the impact of the workforce should be produced.[5] Workforce intelligence systems must deliver consistent, relevant data at the right time, in the right place. Unfortunately, data is often difficult to obtain and quality varies. Agreement between key stakeholders is needed to describe important workforce information that needs to be collected.[5]

The trajectory must be workforce intelligence informing workforce development policies and plans which in turn mobilises national investment in the health workforce.

The Global Pharmacy Observatory: Workforce

Global pharmaceutical workforce data has been collated since 2006.[8] Indeed, analysis of data from 2009[9] and 2012[10] enabled trends to be monitored over the period 2006-2012.[11] The pharmaceutical workforce are medicines experts who play a vital role in improving health outcomes through the effective and responsible use of medicines. It is important to illustrate trends in the pharmaceutical workforce to understand if the supply of pharmacists, pharmaceutical scientists, pharmacy technicians and pharmacy support workers is keeping pace with population growth and disease burden.[12] Alignment of workforce intelligence with an understanding of these factors is vital as well as developments in technology and social values.[2]

The future FIP Global Pharmacy Observatory will build on the original Global Pharmacy Workforce Observatory and provide an integrated global pharmacy-related information hub that can be used to inform advocacy work, policy development, decision-making, the advancement of pharmaceutical practice, sciences, education and of course workforce intelligence. This gateway to pharmaceutical workforce statistics will inform more effective workforce development and workforce planning to transform and scale up the workforce, in particular for those countries that face workforce shortages as they are able to benchmark themselves against other nations. For instance, the 2009 data highlighted the workforce shortage in Kenya that eventually supported the introduction of a residency training programme.[10]

The FIP 2017 survey of its member organisations included questions on the pharmaceutical workforce, the aim of which was to collate a core data set e.g. total number of practising pharmacists per nation. This, as in previous years, will provide a standardised measure: density of pharmacists (number of pharmacists per 10,000 of a nation's population) for nations to benchmark against one another. If a country has a low density of pharmacists this does not on its own indicate a shortage. However, if a shortage is established and another core data including numbers of pharmacy graduates remains static over a period of time it is unlikely that this will be addressed without investment in educating more pharmacists and/or importing pharmacists via migration. Core data such as these examples can act as a trigger for research in order to further understand the profile of a country's workforce and the challenges and opportunities that it faces.

Future work

The global pharmaceutical workforce will continue to be monitored and assessed in order to shape workforce development and capacity thereby realising the Pharmaceutical Workforce Development Goals.[3] Trends over the period 2006-2017 will be analysed following the 2017 FIP survey of its member organisations. Further work is also needed to develop professional, economic and disease indicators to describe the impact of the pharmaceutical workforce mainly (though not exclusively) following investment of resources by national economies.

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3.3 Building academic capacity and the academic workforce

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Driven by:

PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
1. Academic capacity	Engagement with pharmaceutical higher education development policies and ready access to leaders in pharmaceutical science and clinical practice in order to support supply-side workforce development agendas.	• Increase the capacity to provide a competent pharmaceutical workforce by developing initial education and training programmes that are fit for purpose, according to national health resource needs (clinical practice, pharmaceutical science areas and stakeholders across all cadres). • Develop new and innovative ways to attract young pharmacists into all areas of pharmaceutical practice and science (e.g. encourage young pharmacists to consider careers in clinical academia, as preceptors/trainers, in industrial pharmacy, regulatory sciences, nuclear and veterinary pharmacy, among others). • Capacity building should include the ability to meet minimum national standards of facilities, educators and student support in order to ensure access to quality education for all students. • Enhance interprofessional education and collaboration with key stakeholders, including governments, national and international pharmacy/pharmaceutical organisations and patient advocacy groups to achieve sustainable solutions for capacity development. • The clinical academic educator workforce needs more attention to training, career development and capacity building, which must, importantly, include research capacity enhancement.

Summary

a. Academic Capacity is one of the Pharmaceutical Workforce Development Goals (PWDG 1).

b. Having a competent and capable workforce depends on the capacity of the academic workforce to teach and train.

c. Careful planning of the academic workforce is a critical component of developing academic capacity.

d. There remain a number of barriers to achieving Academic Capacity on a global scale.

e. Integrated research, development and evaluation strategies are required to fill the current gaps and drive global implementation of the academic capacity goal.

Background

Building academic capacity refers to any effort being made to improve the abilities, skills, and expertise of educators and of those being educated. It can include human capacity building as well as institutional capacity building for example, buildings, equipment and infrastructure. The capacity to provide pharmaceutical services, cost-effective healthcare, research, innovations in technology and pharmaceutical industry in each country is dependent upon having a competent, adaptable and capable workforce, and a similarly integrated academic workforce to train and support sufficient numbers of new registrant pharmacists and other support staff at both entry-to-practice and advanced levels.

The Pharmaceutical Workforce Development Goal Academic Capacity (PWDG 1) calls for all countries and FIP member organisations to engage with higher education development policies and have ready access to leaders in pharmaceutical science and clinical practice to support supply-side workforce development agendas.

The 2013 FIP*Ed* Global Education Report[1] suggests that pharmacy education, in both capacity and infrastructure, varies considerably between countries, territories and WHO regions, and generally correlates with country level economic development indicators. Those countries and territories with lower economic indicators tend to have the least academic capacity and produce fewer pharmacists.

A global independent Commission on the Education of Health Professionals for the 21st Century reviewed the global status of postsecondary health professional education and concluded that:[2]

> "All health professionals in all countries should be educated to mobilise knowledge and to engage in critical reasoning and ethical conduct so that they are competent to participate in patient and population-centred health systems as members of locally responsive and globally connected teams".

The Commission adopted a global outlook, focussing on the health needs of populations, recognising the increasing demand for integrated health-professionals' education and leadership, and took a systems approach to educational reform, considering health professionals' education itself as a system that overlaps with the health system it attempts to serve. Despite this, educational systems and specifically universities are not currently held accountable for the professionals they develop.

Planning strategies for the academic workforce

Pharmacy programmes increasingly focus on employability and producing 'work-ready' graduates who are initially recruited based on having a vocation in the profession. The move towards massification reduces the time that individual students can expect to spend in one-to-one contact with teaching staff. A focus on research as a key income stream in countries, such as the UK, appears to be leading to greater use of teaching-only contracts. In the UK, an increased number of pharmacy degree programmes has led to rapid promotion of academic staff and to shortages as people who were research and teaching active academics have been forced to focus on developing new programmes.

Academic workforce planning needs to be part of the whole system of pharmaceutical workforce planning. For example, if a country plans to increase graduate output but has a shortage of academics and preceptors to teach, then this quantitative scale up will not be sustainable. Workforce planning in pharmacy education establishments is crucial given the need to recruit and develop staff over an extended timescale, often in competition with other organisations from the same small pool of academics. Senior management needs to be engaged in this too and succession planning is crucial. There is a need to look at the numbers and types of staff, levels and expertise, the changing skills required, role profiles, work allocation, performance and productivity.

Global strategies for academic capacity

The WHO 'National Health Workforce Accounts: A Handbook' calls on all countries to establish accreditation mechanisms for health training institutions by 2020.[3] It also calls on countries to improve health professionals training completion rates, and to reduce their dependency on foreign-trained health workers by half, thereby implementing the WHO Global Code of Practice on the International Recruitment of Health Personnel.4 Extrapolating this for pharmacy, the major policy questions that need answering regarding academic capacity are on production of pharmacists by educational institutions, gender distribution and how the current gaps can be partially addressed by increasing investments in education and production.

The National Health Workforce Accounts has two modules relating to academic capacity. Module 2 'Health workforce in education' indicators aim to map and track health workers in education and training, including the status of pre-entry applicants, new entrants and graduates (Figure 3.5). The provided dimensions can be used to plan and monitor student selection and enrolment, and assess existing policies. In addition to facilitating workforce-specific analysis, the indicators provide information on gender as well as public/private institution distribution. Understanding distribution on a subnational level can also allow for tracking and managing geographical imbalances.

Figure 3.5: WHO National Health Workforce Accounts: Corresponding dimensions for Module 2 Health workforce in education.

Health workforce in education

Pre-entry and entry into education and training

- Applicants to education and training places ratio

Entry into education and training

- Entrants to education and training places ratio
- Entrants to education and training programmes by cadre
- Sex distribution of entrants, by cadre, by institutional ownership
- Ratio of foreign-born entrants
- Entrants to educators ratio

Graduates from education and training programmes

- Sex distribution of graduates by cadre, by institutional ownership
- Graduation rate by cadre
- Education output by cadre, by institutional ownership

Module 4 'Education finances' aims to support the development of an effective financing system that can strengthen intersectoral collaboration between education, lifelong learning and health systems. Figure 3.6 lists the cost of education and training indicators, which include the ratio of health education expenditure to total public education expenditure, and to gross domestic product (GDP). Other indicators include the cost per graduate as well as the cost of educators per graduate. Analysing this information can serve several purposes such as: estimating attrition-linked loss, supporting retention mechanisms and policies, and better understanding on how targeted investments promote gender equality and health equity; this can in turn generate evidence on utilising future investments in health workforce education according to needs.

Figure 3.6: WHO National Health Workforce Accounts: Corresponding dimensions for Module 4 Education finances.

Education finances

Cost of education and training

- Ratio of expenditure on health workforce education to total public expenditure
- Ratio of expenditure on health workforce education to GDP
- Ratio of public expenditure on health workforce education and training to total public expenditure on education
- Cost per graduate
- Cost of educators per graduate
- Cost per graduate in medical specialist education programmes
- Ratio of expenditure on in-service training to total public expenditure on education and training
- Average tuition fee by education and training programme

Current gaps, drivers and opportunities

There is very little existing data on academic capacity in pharmacy globally and it is imperative that member organisations, regulatory bodies, health departments, educational institutions and other stakeholders start to collect and review this data alongside other workforce data.

Qualitative data from the 2013 FIP*Ed* Global Education Report[1] indicates that there is a global shortage of pharmacist academics and of practice based supervisors/preceptors. This has happened for several reasons. One response to workforce shortages was a planned expansion of the number of pharmacy graduates, which occurred or was recommended in countries like Australia, Canada, Ireland, Malaysia, the United Kingdom, and the United States. In developing countries, there is an increasing trend towards adopting the Doctor of Pharmacy (PharmD) degree, which is characterised by having a considerable number of clinical preceptors. In parts of the Middle East, Africa, and countries like Bangladesh, India, Pakistan and Thailand are changing their entry-level qualification to a PharmD. Yet, many of these regions and nations do not have a sufficiently trained and available clinical pharmacists who are competent to act as preceptors.[5]

As the pharmacy curriculum evolved to become more clinical, some countries have employed more clinical academics who may be working in practice but spending some time teaching and some time researching. However, in some countries including many developing countries, all academics have been required to have PhDs and be active in both research and teaching. There is a dilemma though, exemplified in the current UK situation, as the curriculum has become more clinical and more integrated, many leading universities have appointed academics to teaching-only contracts and fewer people are coming into academia via more traditional routes; leading to there being too few people to become full professors and associate professors in clinical pharmacy, social pharmacy and pharmacy practice. Academic promotion has become largely based on teaching with less of a focus on research output.

The understanding of pharmacy education and the significant influencing factors, are essential for planning human resources for health and for achieving universal access to medicines and medicines expertise. Collaboration with key partners, including governments and national and international pharmacy organizations, is crucial to achieving sustainable solutions to the challenges surrounding pharmacy education.

There is a need to define, measure, build, and monitor the academic capacity required to produce the workforce necessary for safe and effective medicines discovery, manufacture, distribution, and use. The Nanjing Global Conference on Pharmacy and Pharmaceutical Sciences Education ran a number of workshops to address the drivers and challenges of achieving the PWDGs on a global scale. At the workshop on PWDG 1 Academic Capacity, a number of priorities were identified: (1) defining "fit for purpose" during a time of great change in healthcare and education, (2) recruiting and training classroom and practice-based instructors for new and non-traditional pharmacy roles, (3) academic collaborations with practice, industry, and interprofessional stakeholders, (4) practice-based definitions of pharmacists, pharmacy technicians, and other support cadres, and (5) the need to include students in discussions of academic capacity.

Workshop participants agreed that while local needs may vary, academic capacity was an important global issue. Diagnostic models and benchmarking tools are needed to help countries estimate the number of and specific competencies for pharmacy-related academics. Additionally, pharmacy leaders must develop skills in advocacy in order to demonstrate to educational, healthcare, and financial policy makers the value of investing in the pharmacy-related academic workforce. This investment is critical for the future of safe and effective medicines development, access, and use.

Barriers identified included the wide range of degree offerings (diploma, BPharm, MPharm, PharmD) globally and potential misunderstandings about these, a lack of shared academic terminology, a lack of distance-based education models which could be critical in achieving capacity, mistrust associated with historical brain drain from lower-middle income countries, local legal constraints in education, and a disconnect between academic advancement expectations (teaching, research, service) and outcomes.

Approaches to researching, developing and evaluating academic capacity

While previous work regarding counting, and describing pharmacy-related academics has been initiated (see FIP Global Pharmacy Workforce reports listed Annex 3), the output of this work has not been complete nor has it been used widely to drive policy. Diagnostic models and benchmarking tools are needed to enable these numbers to motivate global action as well as to be useful in needs-based educational models.

A whole systems approach over a long period of time is needed for countries to bring about the changes required. Evaluation needs to be coproduced and developed with all stakeholders. A mixed methods approach needs to be employed, using a range of established evaluative techniques designed to assess process, outcomes and impacts. It is also necessary to focus on key quantitative variables around supply of graduates, employability and analysis of competencies and measures of stakeholder satisfaction. It will be important to explore effectiveness of partnerships, both qualitatively and through use of tools like social network analysis. Curriculum change can be analysed through standard curriculum evaluation methodologies, for example with the FIP benchmarks as a key reference point for the pharmacy students.

Standard lesson observation approaches can be utilised, followed by staff interviews that discuss pedagogical and curricular matters and probe issues of lecturer identity and satisfaction. Wider institutional capacity development can be

explored through interviews with university managers. Wider impact could be explored through longitudinal, multi-methods case studies. It takes time to sustainably embed learning and develop new institutional policies, practices and partnerships that will deliver innovation and transformed professional education; and outcomes can only be measurable after many years. Meaningful indicators based on international norms and existing data capture practices can be used. There is a need to also draw on realist evaluation methods and political economy analysis, considering where processes have worked well, and where not and why change did and did not happen.

Many challenges remain and succession planning is important to build the academics of the future. What will the 21st century academic look like? Will they be the same as previously and do they have to do it all? Are researching-alone or teaching-alone work modes enough? New pathways for clinical academics should also be developed; for example, the UK's University of Nottingham has developed a 'research practitioner' role where young practitioners have been employed to do a PhD, teach and maintain their practice. The National Institute of Health Research in England has opened up their clinical fellowships, lectureships, professorships to pharmacists wishing to pursue a clinical academic career. Other countries also need to look at promotion routes/tenure tracks for clinical academics that are resource-tailored and needs-based.

PWDG 1 on academic capacity provides an opportunity to develop the passive and active surveillance systems required to produce the pharmacy-related workforce necessary for safe and effective medicines discovery, manufacturing, distribution, and responsible use worldwide. Research, evaluation, development strategies are required to fill the current gaps and allow for the sustainable building of the academic capacity and the academic workforce.

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3.4 Leadership development: preparing the pharmaceutical workforce

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Driven by:

PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
6. Leadership development	Strategies and programmes in place that develop professional leadership skills (including clinical and executive leadership) for all stages of career development, including pharmaceutical sciences and initial education and training.	• Creation of programmes/strategies for the development of leadership skills (including tools and mentoring systems), to support pharmacists and pharmaceutical scientists through their careers. • Advocacy for leadership development in healthcare teams, linked to collaborative working activities (for example, promotion of team-based approaches to healthcare service delivery). • Ideally, this should be linked with competency and foundation and early year career development activities.

Summary

a. Investing in leadership development of the health workforce has been shown to enhance health system organisation and improve patient outcomes.

b. Pharmaceutical Workforce Development Goal 6 "Leadership development" calls on countries and nations to create leadership development strategies and programmes for their pharmaceutical workforce.

c. The UK's national Healthcare Leadership Model and the Leadership Development Framework for pharmacy provide examples of tools and resources for implementing PWDG 6.

d. The efficient implementation of PWDG 6 relies on the integration of leadership development with other aspects of workforce development such as academic capacity (PWDG 1) and quality assurance (PWDG 2).

e. Overall, leadership development in pharmacy is under-researched and little is known about the global status of pharmacy leadership strategies and needs which calls for concerted action led by FIP*Ed* to drive evidence-generation in this area.

Why is leadership development important?

Leadership development is defined as expanding the collective capacity of organisational members to engage effectively in leadership roles and processes.[1] Leader development and leadership development are often confused to mean the same thing, when in fact they are two different concepts. Leader development involves the development of leadership skills and attributes of individuals, whereas leadership development involves a broader vision involving the organisation as a whole.

A likely explanation for the inter-changeable use of the terms could be due to the fact that most leadership studies examined leadership as an individual phenomenon with a focus on behaviours and skills of leaders.[2] However, leadership is a complex phenomenon, which involves the interactions between the leader and the social and organisational environments.[3,4] Through this lens, leaders are expected to have the responsibility of building organisations, setting the vision for their organisation, and expanding their capacity to learn.

Leadership development encompasses the development of organisations by using a broader and collective framework in which leadership is developed in practice and should involve everyone in the organisation.[5] There is good evidence supporting the notion that leadership development is imperative in order for organisations to flourish in today's highly competitive business environment; to achieve this, leadership needs to develop at all levels within the organisation.[6-8]

Both leadership development and leader development are equally important and necessary to increase the leadership effectiveness of an organisation.[2] Leader and leadership development should be integrated to align to the organisational strategy and goals, which if achieved, will have the greatest possible impact for the organisational performance.[9]

Leadership development and the health workforce

Preparing the healthcare workforce encompasses health system organisations; therefore the focus should be on leadership development, which encompasses leader development. Leadership development in healthcare has been identified as an important developmental skill globally.

In the United Kingdom, there has been an increasing emphasis on the significance of leadership development in the National Health Service (NHS), the national health system which provides publicly funded health services to all UK citizens. An evaluation of a clinical leadership programme was conducted amongst nurses (n= 2000) and found that the programme improved the leadership capabilities of ward sisters and senior nurses and in turn contributed to improvements in patient care.[10]

In the United States, data from three qualitative studies of leadership development in healthcare were analysed and the results found that leadership development programmes provide four opportunities to improve quality and efficiency in healthcare:[11]

1. Increases the calibre of the workforce;
2. Enhances the efficiency in the organisation's education and development activities;
3. Reduces turnover and related expenses;
4. And focuses organisational attention on strategic priorities.

It is important to understand the development of leadership attributes of practitioners, alongside the essential infrastructure and support mechanisms need for all levels of practice of the pharmaceutical workforce. The development of appropriate education and training strategies and plans targeted at these attributes will then result in a capable and competent workforce.

This aligns with the WHO statement, "no health without a health workforce", which acknowledges that the delivery of better health requires a workforce that constantly develops and grows to better deliver increasingly complex and evolving health services.

Leadership, leadership development and impact of leadership is under-researched within the pharmacy domain. However, parallels can be drawn from the findings from healthcare and translated into pharmacy.

Leadership development: global progress

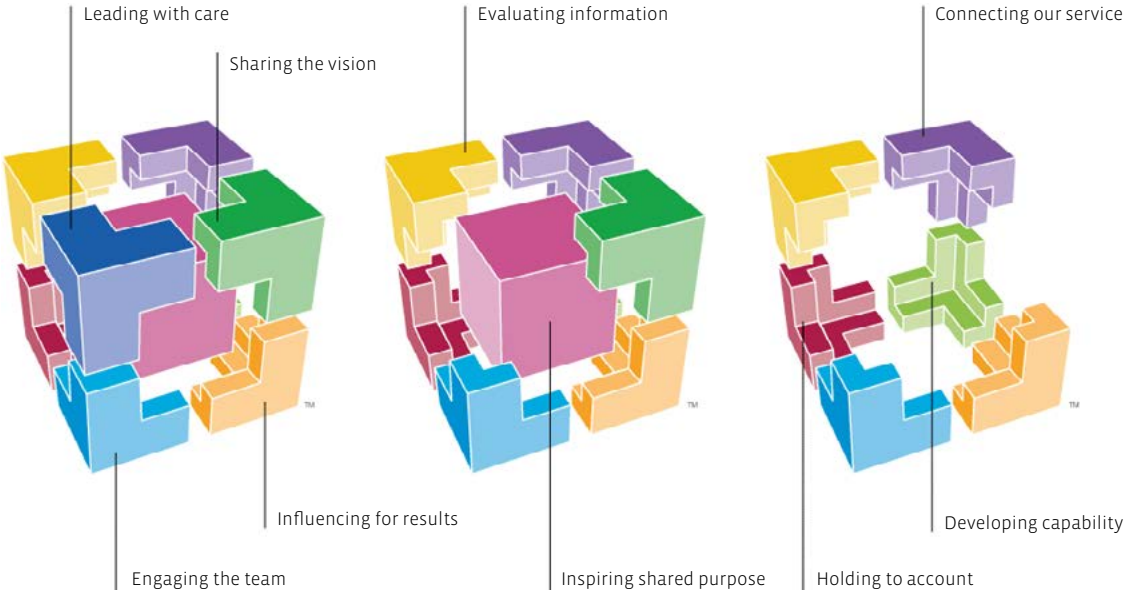
Examples of global progress towards developing leadership in pharmacy have been reported through the country case studies collected for this report (section 2.3.2). Strategies that target leadership development in health and pharmacy come in different forms. Both Australia and Japan emphasise leadership as a competency in their foundational and advanced competency development frameworks for pharmacy. In an effort to instil leadership early on, countries like Costa Rica, Paraguay and South Africa reported incorporating leadership-developing components in the entry-level education of pharmacists. Other countries reported using an array of resources and initiatives for leadership development, including continuing professional development opportunities and training programmes. Leadership development frameworks have been reported in Great Britain and Singapore, and an overview of these frameworks is provided below.

The UK government commissioned a public inquiry into the failings in care at the Mid-Staffordshire NHS Foundation in 2010; the results, reported in the 'Francis Report', highlight the implications of leadership at every level on the quality of healthcare service delivery.[12] Leadership therefore became a focus for healthcare provision in the UK with the launch of the Healthcare Leadership Model for all health workers, and the Leadership Development Framework (LDF) developed by the Royal Pharmaceutical Society (RPS) in Great Britain (RPS) for the pharmaceutical workforce, as well as associated programmes of development aligned to these frameworks.

The Healthcare Leadership Model (HLM), developed by the NHS Leadership Academy, is available nationally to all healthcare professionals.[13] The behaviours incorporated within the framework empower healthcare professionals to make a real difference to patient care and outcomes. The HLM depicts nine leadership dimensions, which have been evident to be important in improving leadership (see Figure 3.7). However, it must be appreciated that competence and ability can vary in each domain; therefore, individuals can assess their strengths using a four-level scale (Essential, Proficient, Strong, and Exemplary).

The RPS developed the LDF, which is based on the HLM.[14] It provides all pharmacists and pharmaceutical scientists with a consistent, uniform approach to developing leadership behaviours to improve quality and efficiency in healthcare. The framework is inclusive and engaging, promoting leadership for everyone within an organisation.

Figure 3.7: The Healthcare Leadership Model: Nine leadership dimensions (Reproduced with permission: Healthcare Leadership Model and associated graphics ©NHS Leadership Academy. All rights reserved.)



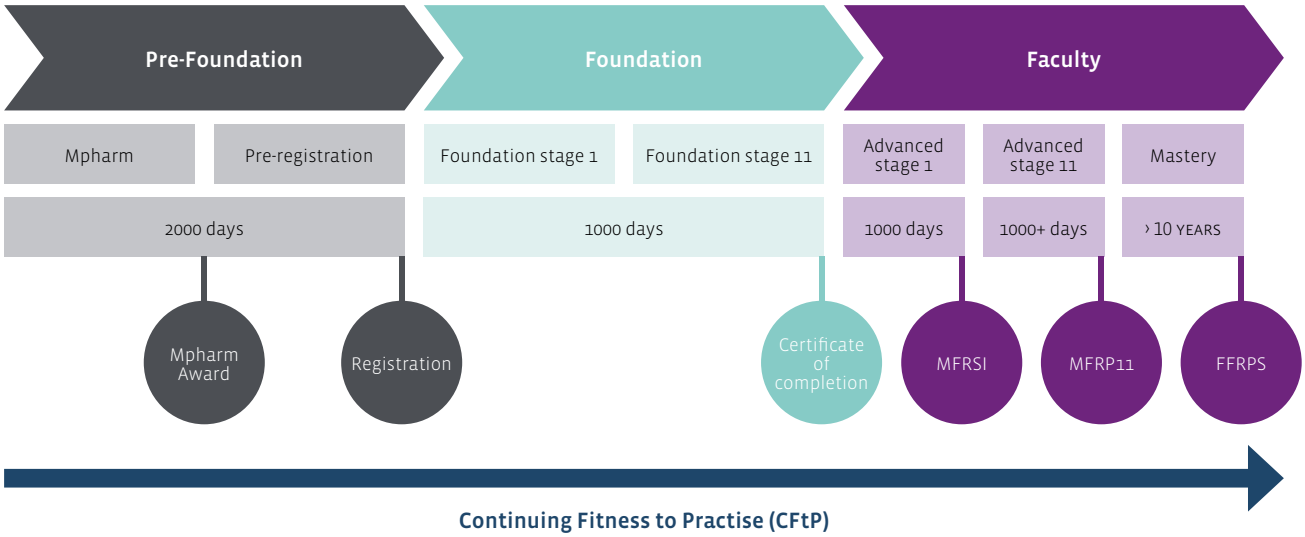
Pharmacists and pharmaceutical scientists are encouraged to complete a self-assessment questionnaire, developed by the Leadership Academy, which generates a detailed report on their strengths and weaknesses within the domains. The report can be used to complete the RPS Leadership Development Action Plan which can be used for appraisals and inform next steps for leadership development.

A 360-degree feedback is available for the HLM and all healthcare professionals are further encouraged to participate with the feedback model. The 360- degree feedback is a professional feedback tool, which allows peer-review of an individual's performance. Individuals receive confidential, anonymous feedback from colleagues at all levels. This typically includes the employee's manager, peers, and people that they manage.

There is good evidence to suggest that 360 feedback is a positive process for leadership development. Individuals whose performance was rated low by their staff were rated higher again several months later, suggesting that these behaviours were modified by the direction given by staff.[15] Research also found that an improvement was noted in managers who attended a leadership training programme after receiving a 360 degree feedback in the dimensions that the participants had selected to work on.[16]

The RPS has developed a roadmap to support the professional development of pharmacists in all stages of their careers.[17]

Figure 3.8: The RPS Professional Development Framework[18] (reproduced with permission).



The RPS Roadmap is designed to identify a practitioner's stage of development based on their experience in the workplace, competence and the ability to manage complexity and then identifying and accessing the support and assessment required to be recognised at that stage.

The RPS describes three principal career stages for pharmacists illustrated in Figure 3.8. Within each stage, leadership development is essential. The modern concept of leadership is not a hierarchical one. There is therefore a need to cultivate leadership early on and it should be instilled as early as the undergraduate years.

Singapore's Ministry of Health established a Healthcare Leadership College (HLC).[19] In line with the national health vision and strategies, the HLC aims to support developing leadership capacity for Singapore's national public healthcare system. HLC develops and delivers high quality learning opportunities and programmes aimed for healthcare leaders working in the public health system. The programmes address leadership development, organisational development, and public service values. In doing so, HLC articulates the national vision for leadership into actions, drives leadership development and builds an institutional leadership culture, and injects thought leadership into the design and innovation of health system models.

HLC developed the S.E.E.D Competency Framework which serves as a basis for leadership programme development. The framework describes the core leadership competencies that are required of leaders at all levels (Self, Enabling, Execution, Direction).

The S.E.E.D Framework describes 16 leadership attributes (listed in Table 3.1) of a healthcare leader's relationship across four dimensions:

1. Self – Demonstrating integrity and the personal qualities of a leader;
2. Enabling – Working with and through others;
3. Execution – Managing and delivering the strategy;
4. and Direction – Setting the direction and the vision.

Each of the four dimensions is accompanied with a set of descriptors that serve to illustrate how the competencies progress as the healthcare leader progresses. These descriptors, listed in Table 3.1, are cumulative across the levels.

In addition the S.E.E.D Competency Framework which guides the work of the HLC, the College also offers an array of programmes such as Milestone Programmes (e.g. Healthcare Policy and Governance Programme), Development Programmes (e.g. Introduction to Systems Thinking) and Lectures (e.g. Distinguished Speakers Series).

Table 3.1: S.E.E.D Competency Framework dimensions and descriptors.

Self	Demonstrating integrity and the personal qualities of a leader	A1	Knowing oneself
		A2	Aligning personal values with organisational values and vision
		A3	Taking responsibility
		A4	Serving a greater purpose
Enabling	Working with and through others	B1	Leading by example
		B2	Communicating and engaging
		B3	Empowering and developing others
		B4	Building effective teams
Execution	Managing and delivering the strategy	C1	Understanding and navigating complexity
		C2	Managing resources, energising people, forging networks
		C3	Strengthening systems and processes
		C4	Driving continuous improvement
Direction	Setting the direction and the vision	D1	Understanding context and influencing policies
		D2	Inspiring a shared vision
		D3	Making tough decisions in dynamic and complex situations
		D4	Building a culture to enable change

Leadership development for the global pharmaceutical workforce

As the global pharmacy leadership body, FIP prioritises the leadership development of the world's pharmaceutical workforce. Pharmaceutical Workforce Development Goal (PWDG) 6 is "Leadership development" and the goal calls on all nations and countries to create national programmes and strategies for the development of leadership skills (both clinical and executive) throughout the career pathways of pharmacists and pharmaceutical scientists. In the UK, there is a range of national programmes and courses to support and cultivate leadership development in healthcare and pharmacy as exemplified by the HLM and LDF, respectively.

PWDG 6 states that these strategies should ideally also be linked with foundational education and training and early career development. For example, the RPS Leadership Development Framework's four-level scale allows for assessment of leadership at all practice levels.

Across all PWDGs –from academic capacity to workforce policy formation, leadership development cannot be implemented without integrated planning throughout all PWDG clusters; in turn, this integration allows for the efficient implementation of the other individual goals.

For example, PWDG 6 Leadership development can be driven through integration with continuing professional development/education (CPD/CE) strategies. CPD/CE plays a key role in developing leadership and as such, there needs to be integration between leadership goals and educational goals which is an important link for professional development. One simple way to achieve this would be to incorporate leadership with CPD requirements; resources for professional development can incorporate materials for leadership training and development. For example, the UK Centre for Pharmacy Postgraduate Education, which offers professional development opportunities for the pharmaceutical workforce, established a 'Leadership school' – a four-day programme over a 12-week period for developing leadership skills in the workplace and improving patient outcomes.

Another example of integrated planning is to incorporate leadership requirements in quality assurance strategies (PWDG 2); by doing so, pharmacy educational providers and pharmacy schools would be accountable for demonstrating leadership development components in their curricula and programmes. The General Pharmaceutical Council (GPhC), which regulates the pharmacy profession and specifies standards for pharmaceutical education in the UK, requires evidence of leadership development in the undergraduate pharmacy curricula from pharmacy schools. The GPhC "Standards for the initial education and training of pharmacists" stipulates that graduates – as clinical decision makers – must be able to demonstrate leadership skills as well as 'lead change'. In addition, the academic faculty must also include pharmacists who are leaders in their profession. Integrating leadership development skills as part of education and training standards can be a means not only to nurturing leadership in the pharmaceutical workforce early on, but also developing academic capacity (PWDG 1).

Moving forward with leadership for pharmacy

Because of the complex nature of leadership the need for high integration between leadership and other aspects of workforce development, FIP member organisations (MOs) can benefit from support tools and resources to guide them in the development of leadership in their workforces. From the UK model, we have learned how leadership development can be integrated throughout all stages of workforce from early education all the way to advanced practice. The UK case study also illustrates the implementation of national leadership frameworks in the pharmaceutical sector of the health workforce. We can also see practical examples of integration between leadership development and CPD and quality assurance. All of these approaches and models can serve as guidance for other nations to create their own needs-based leadership development programmes and strategies.

Developing evidence-based tools and resources, expert guidance, global leadership frameworks, local/institutional case studies, and research studies or projects (e.g. PhD and MPhil) can all guide nations in building leadership development strategies. Exploratory work could help understand the leadership needs of the global pharmaceutical workforce. The status of leadership in pharmacy is a largely abstract concept, and data is required to establish workforce intelligence. The data obtained from this can be used to identify themes to create a foundation for a global leadership framework. The evidence can also be used to create tools, resources and guidance for the workforce to overcome implementation barriers such as those reported by Ghana (section 2.3.2).

Leadership training and development can maximize productivity and shape a positive culture. To achieve this, we must understand leadership in more detail and therefore more research around leadership in pharmacy is needed. Studies that further explore the established attributes for leadership and understand and explain how these connect with health service delivery, clinical leadership and the current health service needs would be recommended.

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PART 4

RESEARCH AND DEVELOPMENT IN TECHNOLOGY-DRIVEN EDUCATION

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4.1 Introduction

Technology in pharmacy education

In the past twenty years, there has been a rapid expansion of the use of technology in education. The development of learning/course management systems such as Blackboard® coincided with a shift from overhead projectors to digital presentations like PowerPoint®. Education and technology are now inseparably intertwined.

Research has shown that universities, both public and private, acknowledge that technological innovation has had and will continue to have major influences on teaching methodologies. Institutional commitment to technology is also becoming a core differentiator in attracting students and corporate partners.[1] A recent survey of 89 US institutions revealed that they all used course management system, 99% used presentation software, and about 90% of those surveyed are also using technology to assess student learning.[2] From a staff perspective, technology can save time,[3] offer self-paced and self-directed content,[3,4] provide instantaneous feedback[5] and deliver a constant message[6] to many students. Students enjoy these same advantages of technology. For example, 'lecture capture' – an umbrella term that describes any technology through which educators can record what happens in their lectures and make it digitally available – allows students to make decisions on the time and place of their learning.

Technology is shaping the development of education by enabling multi-modal teaching, and transforming curricular structures and learning outcomes. As education is becoming more learner-centred, technology can support this process by providing students with platforms for individually-paced learning. Expanding access to educational and reference resources benefits both students and teachers. In terms of research, technology-driven academic collaboration is also contributing to rich research output.

This section will explore the current trends in technology-driven pharmaceutical education; discuss implications of this for workforce education and training strategies, and moving forward with capitalizing on technology to prepare a competent and capable workforce that will improve health and population outcomes.

Technology and health workforce education

In 2006, the World Health Assembly (WHA) called on all Member States to contribute to a rapid scaling up of the production of health workers. Recognising the importance of technology use in health workers education, WHA's Resolution (59.23) also called for "using innovative approaches to teaching in industrialized and developing countries, with state-of-the-art teaching materials and continuing education through the innovative use of information and communications technology."[7]

The World Health Organization (WHO) produced its first guidelines on health workforce education in 2013.[8] These evidence-based guidelines, presented in a report titled "Transforming and Scaling Up Health Professionals' Education and Training", emphasise the importance of scaling-up the health workforce's educational and training systems such that they will adequately meet population needs. The guidelines present 11 Recommendations to transform and scale up health professionals' education and training. Recommendation 5 is dedicated to 'Simulation methods' and asserts that,

"Health professionals' education and training institutions should use simulation methods (high fidelity methods in settings with appropriate resources and lower fidelity methods in resource limited settings) of contextually appropriate fidelity levels in the education of health professionals."

WHO rates the quality of the evidence supporting this Recommendation as moderate, and the strength of the recommendation as strong. One of the Guideline's key policy issues also focuses on the development of qualified educators and trainers as a crucial factor in health professionals education. Recruited faculty members must, in addition to possessing adequate clinical and scientific competencies, be prepared to function pedagogically and this includes being able to use new information technology.

Technology and pharmaceutical education

Electronic health records (EHR) are a prime example of the intersection of information technology with healthcare, but they are only a single component in the broader health information technology (HIT) area. Recent US data surveys found that 84% of nonfederal, acute care hospitals9 and 51% of office-based physicians had adopted a basic EHR.10 Pharmacists therefore clearly need HIT skills; and Fox et al.11 argue that informatics education should be incorporated in pharmacy curricula for all students.

Introduced in the US in the early 1990s, electronic prescribing systems automate the prescribing, supply and administration of medicines in hospitals. These systems can reduce medication errors and impact on patient safety.12 On the other hand, a poorly implemented system could increase error rates.12 There are also electronic discharge systems, barcode identification of medicines, robot dispensing systems, and telecare consultations and services.12 The number of HITs is growing rapidly, strengthening the argument of Fox et al.11

4.2 Global educational technology methods/trends in pharmaceutical education

This section will serve as a review of the literature exploring the latest trends/methods in technology. There is a wide array of ways technology is used in pharmacy education. They vary greatly in terms of how capable and complex they are.[13]

Human-patient simulation

Human patient simulators are high fidelity mannequins with integrated computers to produce clinical functionality such as respiratory movement and ECG monitor readings. Physiologic outputs change in response to student interventions. Healthcare students can use these simulators to learn airway, breathing, cardiac and circulation management. As well as clinical skills, human patient simulators can be used to develop communication and teamwork skills. Although cost is a significant factor, human patient simulators have been shown to be effective and enjoyable learning tools.[14]

Virtual patients

Virtual patients have been used across a variety of healthcare disciplines to train students. Through simulating a lifelike clinical scenario, these virtual patients place the learner in a safe environment in which they can safely make clinical decisions. The students can apply their learning in a practical situation and feedback can be immediate.[14] Virtual patient technology has been found to have two benefits: 1) it is effective for student learning; and 2) students enjoy using the technology.[15]

Computer-aided instruction

Computer-aided instruction (CAI) is a wide collection of technologies used in education ranging from lecture capture systems, learning managements systems, online instructional delivery and audience response systems. Given such a range of tools, and methods through which they can be implemented, one can find studies that support their use and studies that don't.[14] While CAI is widely used,[2] careful planning should go into its deployment to ensure it has an impact on student learning.[14]

4.3 What are the opportunities offered by technology-driven education?

Improving patient care

Smith and Benedict classify educational technology into three categories: computer aided instruction, human patient simulation and virtual patients.[14] In their review, they found that each technology has advantages over traditional education, but that these technologies also have their drawbacks. Benefits ranged from an improved learning experience, repetition and feedback opportunities, clinical variation and customizable individual learning.[14] Possible drawbacks were cost, the need for technical support and infrastructure needs (staff time and space).[14]

Smith and Benedict conducted a review of the literature on the effectiveness of educational technologies to teach patient care skills to pharmacy students[15]. Educational technology was employed with more than 2700 students at 12 colleges and schools of pharmacy in courses including pharmacotherapeutics, skills and patient care laboratories, drug diversion, and advanced pharmacy practice experience (APPE) orientation. Computer-aided instruction, human-patient simulation and virtual patients all offered advantages over traditional teaching methods. These advantages were mainly the result of improved learning experience fidelity, repetition opportunities, faculty feedback, clinical variation, and individualized learning.

Educational technology as a quality indicator

Technology is permitted in some accreditation standards. For example in the US Accreditation Council for Pharmacy Education standard 12.7, 60 hours (of the total 300 hours) of simulation may be used to mimic actual or realistic pharmacist delivered patient care situations.[16] There are a number of technology based simulations including MyDispense[17] (a free web-based community pharmacy simulation programme developed by Monash University, Australia) that could be used in this context. Ferrone et al. measured student perceptions of MyDispense in three US schools of pharmacy.[18] Most students (76%) agreed or strongly agreed that it learning to use MyDispense is straightforward, and 75% reported that MyDispense cases are more realistic than paper cases; 84% of students also found that it offered a safe environment to make errors.

Students view educational technology methods to have a positive impact on their learning. In their study, Stolte et al. surveyed 179 1st, 2nd, and 3rd year pharmacy students of whom 89% were comfortable or very comfortable with technology.[19] The most frequently used technologies for educational purposes were in-class electronic presentations, course materials posted on the school web site, and e-mail. Students responded that course materials had the most

beneficial impact on their learning. Approximately 50% of students indicated that a large amount of technology should be used (e.g. all course content is online, computer simulations, streaming video or audio to accompany live lectures) in the classroom. The students felt that the online course materials (posted on the school Web site, in-class electronic presentations, and e-mail) were the most beneficial educational technology at the school while video-teleconferencing and online testing were the most detrimental educational technologies.

4.4 What are the challenges of technology-driven education?

For all its advantages, technology can be a time-consuming, expensive, and disruptive innovation.

A challenge of the introduction of new technologies such as a virtual patient case is the amount of resources and time required.[14] Approximately 40 hours of time were dedicated to the design and development of an active learning virtual patient activity. This included case design, video lecture composition and recording, and virtual patient construction.

Barriers to implementing technology include student hesitation,[20,21,22] the need for technical support/oversight,[23,24,25] cost, [24,26,27] and resource utilization (eg, space, faculty time).[21,26] A major disadvantage of high fidelity technologies such as human patient simulations is cost. The initial costs of implementing this type of learning include a simulator ($US16,000 to $US90,000), a functional space for the equipment, and simulation specialist support to begin programming.[28]

Technology is not always beneficial for learning. In the study of Stolte et al., the authors found that the technology most frequently cited as "most detrimental to your learning" was video-teleconferencing.[19] While these results are likely due to various factors including technical difficulties, even when lecture transmission quality is satisfactory, students prefer in-person class activities to video-teleconferencing.

Faculty members' adjustment to new technology and teaching methods may be a challenge to implementation. Adjustments to organizational practices such as promotion and tenure may encourage faculty members to embrace technology.[29]

4.5 Conclusions

Using technology in a focused, strategic manner in pharmaceutical education can lift engagement, enjoyment and improved student knowledge and skill. However, technology is not a magic bullet. If used without due consideration in the wrong context, it can be detrimental to these things. Educators must decide upon the appropriate technology for their educational context, resources and student cohort. When used successfully, technology can be a game-changing tool that can improve both the student and educator learning experiences, as well as positively impact patient health outcomes.

4.6 Free support tools and resources for educators

PharmAcademy

SABER, a site under FIP patronage for sharing and building education resources, was widely acknowledged to be a useful tool but was receiving only a modest number of visitors and resource uploads/downloads. Measures to increase traffic included adding a journal hosting system for the Pharmacy Education journal, adding news story and blogging functionalities and adding tools to facilitate the development and maintenance of communities of practice. PharmAcademy (www.pharmacademy.org) was created and will become the 'go-to' place for pharmacy educators worldwide to connect, and share knowledge and resources. PharmAcademy is a community site designed to connect pharmacy educators globally. It delivers significant enhancements to the SABER service from which it is born, as mentioned above.

In fact, SABER is now just one of three principle components that make up PharmAcademy – the other two components being the updated portal for *Pharmacy Education* journal and a community networking component designed to keep educators informed and in touch with the pharmacy education world.

The new portal for *Pharmacy Education* significantly streamlines the review and publication process, and the informal community publishing and peer networking space invite the worldwide community of pharmacy educators to connect dynamically online.

Pharmacy Education journal

The journal (http://pharmacyeducation.fip.org) provides a forum for communication between academic teachers and practitioners in professional education, with an emphasis on new and established teaching and learning methods, new curriculum and syllabus directions, guidance on structuring courses and assessing achievement, as well as the dissemination of new ideas. The journal also recognises the importance of policy issues and current trends in the context of education and professional development. The journal publishes reports of research and innovation in all aspects of professional pharmacy education and training, case studies, country studies, innovations in laboratory and professional educational practice, reviews and reports on information technology in education and reviews of current literature.

The journal has a clear international perspective, and has a longstanding policy of facilitating publication, in particular for younger Faculty, those authors whose first language may not be English, and manuscripts from all regions seeking low cost engagement with the wider global community.

MyDispense

MyDispense (https://info.mydispense.monash.edu) is an online community pharmacy simulation that allows students to develop and practise their dispensing skills. Through highly interactive dispensing exercises, MyDispense allows students to develop skills and confidence in safe, best-practice dispensing of pharmaceutical products. The web application supports a total dispensing experience, from initial communication with the patient and prescriber to professional advice when handing medicines to patients. The application features a dispensing system with many features of commercial dispensing programmes to give students an authentic experience in modern dispensing practice. At the end of each exercise, students receive rich, contextual feedback on their dispensing performance. Students are able to explore patient-based scenarios that they're likely to encounter in real life. Tutors can build new exercises by combining elements from a database of over 420 patients, 40 prescribers and 2400 pharmacy products to create limitless scenario variations. Students must make professional decisions to successfully complete the carefully graduated exercises. The MyDispense environment is paperless for students. It utilises virtual representations of patients, barcodes, labels and products. Built using advanced web programming, it's designed to run on the broadest possible range of computers. Being web based, it's accessible from anywhere – on campus or from home – and doesn't require downloaded plugins or additional software. There are currently 43 different institutions using MyDispense.

Massive open online courses (MOOCs)

A massive open online course is accessed through the web with no limitations on attendance. Emerging from the open educational resources movement in 2008, the first MOOC "Connectivism and Connective Knowledge" had over 2200 students who paid nothing.[30] As other MOOCs were developed, other online learning resources were born. Khan Academy, Peer-to-Peer University (P2PU), Udemy, and ALISON — are similar to MOOCs and allow students to work at their own pace.

In 2011 Stanford University launched three MOOCs. The first was "Introduction Into AI", led by Sebastian Thrun and Peter Norvig. Over 160,000 students enrolled. Two more MOOCs were led by Andrew Ng and Jennifer Widom. Following the publicity and high enrollment numbers of these courses, Thrun started a company he named Udacity and Daphne Koller and Andrew Ng launched Coursera. In January 2016, Coursera had 1580 courses and Udacity more than 120 courses.[31]

The *New York Times* called 2012: The Year of the MOOC.[32] In that year, MIT created not for profit MITx. When Harvard joined MITx, the name was changed to edX. UC Berkeley joined later that year. In December 2016 Harvard University and MIT surveyed their first four years of courses on edX.[33] They looked at 290 courses with over 2.4 million unique participants. The media age of participants was 29, 33% of participants were female and 73% of participants held a bachelor's degree.

Because of massive enrollments, MOOCs require instructional design that facilitates large-scale feedback and interaction. The two basic approaches are:

- Peer-review and group collaboration
- Automated feedback through objective, online assessments, e.g. quizzes and exams.

MOOCs following the first approach are called connectivist MOOCs (cMOOCs), while those following the second approach are called broadcast MOOCs.

Even though enrolments in MOOCs can be in the thousands, only a small number of participants actually complete their course. Research indicates that the current average completion rate is around 15%.[34]

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PART 5

SUMMARY AND CONCLUSIONS

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5.1 Implications for the pharmaceutical workforce

Investing in the health workforce contributes towards universal health coverage (UHC), Sustainable Development Goals (SDGs) and strengthening health systems. The launch of the UN High-Level Commission on Health Employment and Economic Growth is testament to the value in investing in global health workers; and the UN Commission recommendations for transforming the health workforce are intended to drive progress towards the global health development agenda.

As medicines experts, the pharmaceutical workforce plays a key role in improving health outcomes through optimizing the responsible use of medicines. Investing in the development of an adaptable, flexible, competent and well-distributed pharmaceutical workforce is an imperative. It is also imperative that we have both a clear vision and a set of actionable goals and plans for transforming the workforce.[1] The Global Vision for Education and Workforce,[2] the Pharmaceutical Workforce Development Goals (PWDGs),[3] and the Nanjing Statements[4] provide a global roadmap for pharmaceutical workforce development.

Research, development and evaluation mechanisms are integral to achieving progress on our Global Vision and the PWDGs; global engagement to make research, development and evaluation strategies an important consideration for implementing the pharmaceutical workforce development agenda is critical. The aim of this current report is to start a dialogue and foundation for thinking about the scope and range of a research, development and evaluation agenda for the global and national workforces of pharmacists, pharmaceutical scientists and pharmacy support workers.

5.2 Developing a baseline for transforming the global pharmaceutical workforce

One of the overarching purposes of this report is to provide a starting point for describing our current 'baseline' in the context of workforce and educational development. In the context of a Global Vision, we should be identifying our current position in order to plan for structured development.

A series of individual country-level case studies have been evaluated for this report; although not meant to be a statistically-driven sample, these country cases are indicative of the workforce planning and development priorities that are emerging across national leadership bodies. We believe that as a first step towards a situational description of the global workforce, these case studies show patterns and gaps on which a global strategy, reflected in local needs, should focus efforts.

It is clear that the full scope and range of the PWDGs is being addressed across nations. It is also clear that for some PWDGs there is a wider 'gap' in relation to others. For example, leadership development (PWDG 6) and workforce gender and diversity balances (PWDG 10) have less traction than competency development (PWDG 5) or CPD strategy development (PWDG 9).

It has also become clear, supported by some previous FIP*Ed* reports5 that terminology describing workforce and education has become confusing; for example, the local meaning of "Foundation training" or "Specialist practice" has variance between countries and regions. Building a database of terminology can identify points of equivalence within the workforce lexicon.

Understanding the current global trends in research, development and evaluation and identifying knowledge gaps, drivers and opportunities for future work is clearly important. The case study findings reported in Part 2 of this report are intended to support national leadership bodies and member organisations in the effective implementation of a needs-based pharmaceutical workforce development roadmap.

5.3 Evaluation and impact for global workforce development

The logic model - described in section 3.2 as a tool for facilitating effective programme planning, implementation and evaluation – uses a hybrid approach to describe ways in which pharmacy practice may be evaluated in the context of health systems strengthening. Given the importance of measuring the results produced by pharmacists pursuing the global workforce development goals, an understanding of how to plan workforce impact evaluation studies is vital; yet this remains and underexplored area in research. The model can therefore stimulate researchers and experts to begin discussions on impact measurement.

5.4 Workforce intelligence imperatives

A fundamental understanding of the capacity of our global workforce is a necessary prerequisite for any transformational strategy or policy formation. Workforce intelligence, discussed in section 3.2, provides strategic workforce information to support workforce planning and expanding access to healthcare delivery. With developing and sharing workforce intelligence being one of the Pharmaceutical Workforce Development Goals (PWDG 12), it is clearly important to understand if the supply of pharmacists, pharmacy technicians and pharmacy support workers is keeping pace with health service and population needs. It is also, equally important that the education and training of pharmaceutical scientists is meeting the research, teaching and drug development needs associated with healthcare and scientific planning.

5.5 Academic capacity for preparing a transformative workforce

The training of the next generation of pharmacists, pharmaceutical scientists and pharmacy support workers is an essential component of workforce intelligence objectives. Scaling up the academic capacity in pharmacy relies on the development of an expert academic workforce that is able to teach and train the next workforce generation. There are current gaps, drivers and opportunities in academic capacity development. Careful integrated planning is required to develop academic capacity through the academic workforce and section 3.3 described approaches to researching, developing and evaluating academic capacity.

5.6 Leadership development of the pharmaceutical workforce

Investing in leadership development of the health workforce has been shown to enhance health system organisation and improve patient outcomes; we have no doubt from the current evidence that this is particularly true for the pharmaceutical workforce and that strategies for leadership development should be visible in all countries. Countries and nations should ensure the creation of clear and accessible leadership development programmes and opportunities for their pharmaceutical workforce. This report provides good examples of where this has been the case. However, the implementation of leadership development should be integrated with other aspects of workforce development.

5.7 Research and development in technology-driven education

Workforce development is clearly an educational issue – as outlined in the FIP Nanjing report.[1] The educational research and evaluation agenda in pharmacy needs to be developed; and the research, development and evaluation associated with technology-driven education needs to be especially strengthened. Using technology in a focused, strategic manner in pharmaceutical education can enhance education and workforce development. Technology can also improve both the student and educator learning experiences, as well as positively impact patient health outcomes when used in the pharmaceutical and the health sciences education. Evaluating the impact of technology-driven education needs to be conducted to identify impactful ways to use technology in pharmaceutical education.

5.8 Conclusion

This report provides strong evidence that leadership bodies and membership organisations are already able to use the global structure provided by the Global Vision and PWDGs in order to describe current national strategies and mechanisms for workforce development, including education and training. A firmer, more comprehensive situational analysis must be undertaken, building on this initial report, one which sets out the way for a clear planning and action route for transformative development of the global workforce – together with a set of measurable workforce actions that will provide the foundations for future pharmaceutical healthcare delivery. Adopting this imperative is a necessity to underpin the future development of our profession.

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ANNEXES

Annex 1. Pharmaceutical Workforce Development Goals (PWDGs)

Cluster	PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
Academy Focus on the schools, universities and education providers	**1. Academic capacity**	Engagement with pharmaceutical higher education development policies and ready access to leaders in pharmaceutical science and clinical practice in order to support supply-side workforce development agendas.	• Increase the capacity to provide a competent pharmaceutical workforce by developing initial education and training programmes that are fit for purpose, according to national health resource needs (clinical practice, pharmaceutical science areas and stakeholders across all cadres). • Develop new and innovative ways to attract young pharmacists into all areas of pharmaceutical practice and science (e.g. encourage young pharmacists to consider careers in clinical academia, as preceptors/ trainers, in industrial pharmacy, regulatory sciences, nuclear and veterinary pharmacy, among others). • Capacity building should include the ability to meet minimum national standards of facilities, educators and student support in order to ensure access to quality education for all students. • Enhance interprofessional education and collaboration with key stakeholders, including governments, national and international pharmacy/pharmaceutical organisations and patient advocacy groups to achieve sustainable solutions for capacity development. • The clinical academic educator workforce needs more attention to training, career development and capacity building, which must, importantly, include research capacity enhancement.
	2. Foundation training and early career development	Foundation training infrastructures in place for the early post-registration (post-licensing) years of the pharmaceutical workforce as a basis for consolidating initial education and training and progressing the novice workforce towards advanced practice.	• Create clear and purposeful education and training pathways/programmes to support post-registration (post-graduation) foundation training (clinical practice and pharmaceutical science areas). • Develop early career maps and frameworks to support a seamless transition into early career practice and towards advanced practice. • Develop structured approaches to early career mentoring systems to support novice practitioners to engage with peers and preceptors (in clinical practice and pharmaceutical science areas across the pharmaceutical workforce).

Cluster	PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
Academy Focus on the schools, universities and education providers	**3. Quality assurance**	Transparent, contemporary and innovative processes for the quality assurance of needs-based education and training systems.	• Ensure the quality of the workforce by quality assuring the continuous development and the delivery of adequate and appropriate education and training; quality assurance needs to address academic and institutional infrastructure in order to deliver the required needs and competency-based education and training. • Establish standards-based global guidance for quality assurance of pharmacy and pharmaceutical science education in the context of local needs and practice. • Implement fair, effective and transparent policies and procedures for quality assurance of pharmacy and pharmaceutical science education and training. • Define critical stakeholder input on development of adequate education and training and fair and effective policies, including necessary student input.
Professional development Focus on the pharmaceutical workforce	**4. Advanced and specialist expert development**	Education and training infrastructures in place for the recognised advancement of the pharmaceutical workforce as a basis for enhancing patient care and health system deliverables.	• Need for a common and shared understanding of what is meant by “specialisation” and “advanced practice” in the context of scope of practice and the responsible use of medicines. • Ensure competency and capability of an advanced and expert pharmacist in all sectors (including specialisations extending into industry and administration settings) for greater optimisation of complex pharmaceutical patient care. This may now include prescribing roles within a recognised scope of practice. • Systematic use of professional recognition programmes/systems as markers for advancement and specialisation across the workforce, including advanced pharmaceutical scientists.

Cluster	PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
Professional development Focus on the pharmaceutical workforce	**5. Competency development**	Clear and accessible developmental frameworks describing competencies and scope of practice for all stages of professional careers. This should include leadership development frameworks for the pharmaceutical workforce.	• Use of evidence-based developmental frameworks to support the translation of pharmaceutical science within scope of practice, across all settings and according to local/ national needs. • Support professional career development by using tools, such as competency frameworks, describing competencies and behaviours across all settings. • Evidence of clear policy that links leadership development (from early years) with competence attainment for the advancement of practice activities.
	6. Leadership development	Strategies and programmes in place that develop professional leadership skills (including clinical and executive leadership) for all stages of career development, including pharmaceutical sciences and initial education and training.	• Creation of programmes/strategies for the development of leadership skills (including tools and mentoring systems), to support pharmacists and pharmaceutical scientists through their careers. • Advocacy for leadership development in healthcare teams, linked to collaborative working activities (for example, promotion of team-based approaches to healthcare service delivery). • Ideally, this should be linked with competency and foundation and early year career development activities.
	7. Service provision and workforce education and training	A patient-centred and integrated health services foundation for workforce development, relevant to social determinants of health and needs-based approaches to workforce development.	• Systematic development of education and training activities based on local healthcare systems, their capacity and funding. • Evidence of systematic development policies and strategies for the strengthening and transforming pharmaceutical workforce education and the systematic training of trainers/educators. • Education providers must ensure, by the provision of evidence-based approaches, that lecturers/teachers/trainers are themselves appropriately trained for capability and competency. • Enable the pharmaceutical workforce* and key stakeholders to promote health equity through actions related to social determinants of health.

Cluster	PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
Professional development Focus on the pharmaceutical workforce	**8. Working with others in the healthcare team**	Clearly identifiable elements of collaborative working and interprofessional education and training which should be a feature of all workforce development programmes and policies.	• Evidence of policy formation to demonstrate how healthcare professionals can develop and engage in partnerships to achieve better health outcomes. • Develop education and training strategies/ programmes to ensure collaboration within the pharmaceutical workforce and training on medicines for other healthcare professionals. • Ideally, this should be linked with formal professional development activities.
Systems Focus on policy development, governmental strategy and planning, and monitoring systems	**9. Continuing professional development strategies**	All professional development activity clearly linked with needs-based health policy initiatives and pharmaceutical career development pathways.	• Evidence of an effective continuing professional development strategy according to national and local needs. • Development of programmes to support professional development across all settings of practice and all stages of a pharmacist's career. • Ideally, this should be linked with all professional development activities across the workforce. • Education in continuing professional development strategies and self-directed behaviours should be initiated at the student level.
	10. Pharmaceutical workforce gender and diversity balances	Clear strategies for addressing gender and diversity inequalities in pharmaceutical workforce development, continued education and training, and career progression opportunities.	• Demonstration of strategies to address the gender and diversity inequalities across all pharmaceutical workforce and career development opportunities. • Ensure full and effective participation and equal opportunities for leadership at all levels of decision-making in pharmaceutical environments; avoidable barriers to participation for all social categories are identified and addressed. • Engagement and adoption of workforce development policies and enforceable legislation for the promotion of gender and diversity equality; policies and cultures for the empowerment of all without bias. • This should be applicable to academic capacity and leadership development activities.

Cluster	PWDG	PWDG general description. Countries/territories and member organisations should have:	Rationale, drivers, and potential indicators
Systems Focus on policy development, governmental strategy and planning, and monitoring systems	**11. Workforce impact and effect on health improvement**	Evidence of the impact of the pharmaceutical workforce within health systems and health improvement.	• Engagement with systems to measure the impact of the pharmaceutical workforce on health improvement and healthcare outcomes. Links with needs-based education, training and workforce planning. • Gather continuous data points to monitor the performance of the pharmaceutical workforce. • Ideally, this should be linked with strategies to enhance workforce intelligence.
	12. Workforce intelligence	A national strategy and corresponding actions to collate and share workforce data and workforce planning activities (skill mixes, advanced and specialist practice, capacity). Without workforce intelligence data there can be no strategic workforce development.	• FIP should aim to have a global workforce compendium of case studies developed by 2019. • Develop monitoring systems to identify workforce trends to enable decision making on deployment and supply of pharmaceutical workforce noting that time-lags are often present in these activities. • Ideally, this should be linked with stewardship and leadership for professional leadership bodies.
	13. Workforce policy formation	Clear and manageable strategies to implement comprehensive needs-based development of the pharmaceutical workforce from initial education and training through to advanced practice.	• Adopt and strengthen sound policies and enforceable legislation for holistic needs-based approaches to professional development across all settings and stages. • Develop strategies where pharmaceutical science and professional services are the driving forces for this activity.

Annex 2. PWDGs alignment with global health workforce strategies

The Pharmaceutical Workforce Development Goals (PWDGs) are aligned with:

UN High-Level Commission on Health Employment and Economic Growth Recommendations and Immediate Actions; **WHO's Global Strategy on Human Resources for Health** Objectives, Milestones and Policy Options; and **ILO OECD WHO Working for Health: Five-Year Action Plan for Health Employment and Inclusive Economic Growth (2017–2021)** Workstreams.

PWDG general description. Countries/territories and Member Organisations should have:		UN Commission's Recommendations and Immediate Actions	WHO Global Strategy Objectives, Milestones, and Policy Options	ILO OECD WHO Five-Year Action Plan Workstreams
1 ACADEMIC CAPACITY	**Academic capacity** Engagement with pharmaceutical higher education development policies and ready access to leaders in pharmaceutical science and clinical practice in order to support supply-side workforce development agendas.	1, 3, 5, 6, 8, A	1, 2, 3	1, 3, 5
2 FOUNDATION TRAINING	**Foundation training and early career development** Foundation training infrastructures in place for the early post-registration (post-licensing) years of the pharmaceutical workforce as a basis for consolidating initial education and training and progressing the novice workforce towards advanced practice.	1, 3, 6	1, 2	
3 QUALITY ASSURANCE	**Quality assurance** Transparent, contemporary and innovative processes for the quality assurance of needs-based education and training systems.	1, 3, 5, 6	1	
4 ADVANCED AND SPECIALIST DEVELOPMENT	**Advanced and specialist expert development** Education and training infrastructures in place for the recognised advancement of the pharmaceutical workforce as a basis for enhancing patient care and health system deliverables.	1, 3, 6, 9	1	1, 3
5 COMPETENCY DEVELOPMENT	**Competency development** Clear and accessible developmental frameworks describing competencies and scope of practice for all stages of professional careers. This should include leadership development frameworks for the pharmaceutical workforce.	1, 3, 6	1	
6 LEADERSHIP DEVELOPMENT	**Leadership development** Strategies and programmes in place that develop professional leadership skills (including clinical and executive leadership) for all stages of career development, including pharmaceutical sciences and initial education and training.	2	1	
7 SERVICE PROVISION AND WORKFORCE E&T	**Service provision and workforce education and training** A patient-centred and integrated health services foundation for workforce development, relevant to social determinants of health and needs-based approaches to workforce development.	1, 3, 4, 5, 6	1, 2	
8 WORKING WITH OTHERS	**Working with others in the healthcare team** Clearly identifiable elements of collaborative working and interprofessional education and training which should be a feature of all workforce development programmes and policies.	1, 5, 6, 8	1	

PWDG general description. Countries/territories and Member Organisations should have:		UN Commission's Recommendations and Immediate Actions	WHO Global Strategy Objectives, Milestones, and Policy Options	ILO OECD WHO Five-Year Action Plan Workstreams
	Continuing professional development strategies All professional development activity clearly linked with needs-based health policy initiatives and pharmaceutical career development pathways.	**1, 3, 6**	**1**	
	Pharmaceutical workforce gender and diversity balances Clear strategies for addressing gender and diversity inequalities in pharmaceutical workforce development, continued education and training, and career progression opportunities.	**1, 2**	**1, 2**	
	Workforce impact and effect on health improvement Evidence of the impact of the pharmaceutical workforce within health systems and health improvement.	**1, 6**	**3, 4**	**1, 2, 4**
	Workforce intelligence A national strategy and corresponding actions to collate and share workforce data and workforce planning activities (skill mixes, advanced and specialist practice, capacity). Without workforce intelligence data there can be no strategic workforce development.	**1, 2, 5, 10, C, E**	**1, 2, 4**	

Annex 3. Overview of FIP*Ed* tools

	FIP*Ed* Tools/Description	Concept/Content	Aimed for:
	Quality Assurance The Framework is offered primarily as a tool — to be used in whole or in part — to facilitate the establishment of systems of quality assurance in countries where no such formal systems exist or for improvement of existing systems. Where regional similarities and collaborations exist, the Framework may also be applied at a regional rather than national level. Where resources or other constraints limit the immediate application of some of the principles outlined in the Framework, it is hoped that the document can serve as a "road map" for the future. http://bit.ly/29zgrSc	• Prerequisites for Quality Assurance in Pharmacy Education • Quality Criteria and Quality Indicators for Pharmacy Education • The Quality Assurance Agency • Glossary	• Higher Education Institutions • Professional Associations • Regulators
	Workforce Intelligence The reports have set out to recognise the major challenges facing both the profession and global health care systems. The quality, scope and capability of the workforce are dependent on the nature of initial and life long professional development curricula, and the quality of available practitioner support and recognition structures. http://bit.ly/29kipF8	**2006** • Data from 17 countries and territories • Case studies from 7 countries and territories [Australia, Canada, Ireland, Ghana, Kenya, New Zealand, United Kingdom] **2009** • Data from 56 countries and territories • Case studies from 7 countries and territories [Australia, Canada, Great Britain, Kenya, Jordan, Uruguay, Vietnam] • Needs-based Educational Model • WHO chapter **2012** • Data from 90 countries and territories • Case studies from 9 countries and territories [Afghanistan, Costa Rica, Ghana, Great Britain, Japan, Pacific Islands, Singapore, South Africa, Tanzania] • WHO chapter **2015** • Trends analysis conducted with data from the workforce reports (2006, 2009 and 2012) • Data from 51 countries and territories	• Professional Associations • Regulators • Higher Education Institutions • Industry

	FIP*Ed* Tools/Description	Concept/Content	Aimed for:
	FIP UNESCO-UNITWIN Global Pharmacy Education Development Network UNITWIN/Cooperation Programme on Global Pharmacy Education (GPhED) was created within the framework of the UNESCO -UNITWIN Programme to fulfil objectives such as sharing best educational practice between and among education institutions and other education providers across borders.	• Network of Schools • Centres of Excellence: Global – 1st one, African Centre of Excellence [Founding partners: Ghana, Uganda, Nigeria, Namibia, Zambia; Malawi]	• Higher Education Institutions • Educators
	Global Competency Framework (GbCF) Promotes the development of knowledge, skills, attitudes and behaviours that an individual develops through education, training, development and experience as means to create a capable practitioner workforce in all healthcare professions. The GbCF v1 is divided in 4 clusters/areas of practice, 20 competencies and 100 behavioural competencies. It is intended to act as a mapping tool and can be adapted according to the country or local needs. These competencies improve therapeutic outcomes, patients' quality of life, scientific advancement and enhancement of public health imperatives. http://bit.ly/1TIMWe3	The GbCF contains: • The drivers for the development of a global competency framework. • The process of the GbCF development. • The concept of the GbCF competencies. • Guidance on how to use the GbCF. • The GbCF framework.	• Professional Associations • Regulators • Higher Education Institutions • Employers • Industry • CPD/CE providers • Individual Pharmacists
	Pharmacy Support Workforce Pharmacy technicians and support staff, pharmacists and individuals who work with the pharmacy support workforce in education, practice, regulation, development and promotion explore how to educate, develop and fully utilise the pharmacy support workforce within the healthcare system. The discussions and debate during this one-and-a-half-day symposium focus on areas of critical importance for sustainability of health care programmes, with a focus on global initiatives that support and strengthen the work of mid-level cadres in the delivery of pharmacy services.	• The domain initiated an annual FIP Global Pharmacy Technician and Pharmacy Support Workforce Symposium in 2012, which has been the basis for increased sharing and practice development.	• Professional Associations • Regulators • Higher Education Institutions • Employers
	Global Education Report Academic and Institutional Capacity Domain FIP*Ed* Global Education report provides a baseline on the current status, transformation and scaling up of pharmacy and pharmaceutical sciences education globally. http://bit.ly/29qvMko	• Data from 109 countries and territories • Case studies from 14 countries and territories [Chile, Great Britain, Japan, Jordan, Malaysia, Namibia, Philippines, Portugal, Saudi Arabia, Switzerland, Thailand, UAE, USA, Zimbabwe]	• Professional Associations • Regulators • Higher Education Institutions

	FIP*Ed* Tools/Description	Concept/Content	Aimed for:
	Continuing Professional Development/ Continuing Education (CPD/CE) Report CPD is "the responsibility of individual pharmacists for systematic maintenance, development and broadening of knowledge, skills and attitudes, to ensure continuing competence as a professional, throughout their careers". An ongoing cyclical process involving: self-appraisal, developing a personal learning plan, taking action or implementing the learning plan, and evaluation. The report has presented the current trends and activities with regard to professional development and lifelong learning across countries and territories globally. http://bit.ly/29vvRUE	• Data from 66 countries and territories • Case studies from 9 countries and territories [Australia, Canada, Croatia, Japan, Namibia, New Zealand, Northern Ireland, Oman and USA]	• Professional Associations • Regulators • Higher Education Institutions • Employers • Industry • Other providers of CPD/CE
	Interprofessional Education (IPE) Report The report presents a collection of case studies and examples that reflect innovation and creativity centred on IPE. These case studies highlight diverse approaches and show that IPE is becoming a more mainstream education activity for students, trainees and practitioners worldwide. Still, FIP*Ed* acknowledges the limited evidence and evaluation regarding the long-term impact of IPE initiatives. This suggests that it is needed to continue to follow projects such as those highlighted here and also encourage stronger interprofessional dialogue about monitoring and evaluation methods. http://bit.ly/29qUuUg	• A WHO case study. • Case studies from 12 regional, national and institutional-level examples and initiatives [Professional bodies, Accreditation agencies, Student organisations, Australia, China, Kenya, Lebanon, Malaysia, Namibia, Philippines, UK (Great Britain), Uruguay]	• Professional Associations • Higher education institutions • Employers
 	PharmAcademy PharmAcademy is the go-to place for pharmacy educators worldwide to connect, and share knowledge and resources. It is a community site designed to connect pharmacy educators globally. http://pharmacademy.org/ ***Pharmacy Education* Journal** Hosted by PharmAcademy, the journal is a peer-reviewed publication, allowing free submission and access to over 500 articles around pharmacy and pharmacy education workforce. 14,000 journal article donwloads since August 2015. http://bit.ly/2a1pdbC	PharmAcademy, is an online platform where is possible to: • Learn from others with more experience. • Teach and guide others with less experience. • Publish stories and news items of interest to the community. • Join or create groups of peers that share common interests. • Participate in the development of pharmacy education. • Publish on the *Pharmacy Education* Journal.	• Educators • Individual Pharmacists • Authors

	FIP*Ed* Tools/Description	Concept/Content	Aimed for:
	Advanced Practice and Specialisations Report This report is the most comprehensive collection of data and evidence that relates to practitioner advancement of practice and policy, and maps out a wide range of national initiatives worldwide. This report should be viewed as a first attempt to map out global trends and will stimulate further reportage and analysis as engagement in this practice continues to progress. http://bit.ly/29zgP3j	• Data from 48 countries and territories • Case studies from 17 country and territories [Argentina, Australia, Canada, China, India, Ireland, Japan, Malaysia, New Zealand, Philippines, Portugal, Singapore, South Africa, Spain, Switzerland, United Kingdom (Great Britain), USA]	• Professional Associations and Regulatory Authorities • Employers • Individual Pharmacists
	Transforming Our Workforce Transforming Our Workforce is an enabling document that describes evidence-based and tested tools and mechanisms whereby leadership bodies and policymakers can gain traction for advancing the pharmaceutical workforce. http://bit.ly/29kipF8	• Development case studies of the 10 FIP*Ed* tools • Case studies from 14 national and institutional-level examples and initiatives [Australia, Chile, Croatia, India, Jordan, Malawi, New Zealand, Kenya, Serbia, Spain, Thailand, UK (Great Britain)]	All Stakeholders • Professional Associations • Regulators • Higher Education Institutions • Employers • Industry • Individual Pharmacists

ANNEX 4. ACKNOWLEDGEMENTS

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